

ECONOMICS, PLANNING DEVELOPMENT AND STATISTICS UNIT, TREASURY DEPARTMENT,  
FUALAHI, ALOFI SOUTH

# Niue Vital Statistics Report: 1987 - 2011

Niue Statistics Unit & Statistics for Development  
Programme, Secretariat of the Pacific  
Community(SPC)



Produced with assistance from the Statistics for development Programme, Secretariat of the Pacific Community (SPC)

This report was compiled by FanumaSioneholo from the Niue Statistics Office, with Karen L Carter (SPC), KimrayVaha (Niue Statistics Office), No'oroaMarsh (Niue Civil Registry Office), and PuasinaTatui (Niue Department of Health)

Published by the Niue Statistics Unit, Department of Treasury, Niue; with assistance from the Statistics for Development Programme, Secretariat of the Pacific Community (SPC), Noumea, New Caledonia. Work for this project was supported by the Brisbane Accord Group of agencies under the Pacific Vital Statistics Action Plan (2011 – 2012) and the Pacific Ten-Year Statistics Strategy.

©Niue Statistics Department

### **SUMMARY OF MAIN INDICATORS**

2011 Census population, residents only	1460	
Total number of births, 1987 - 2011	797	
Total number of deaths, 1987 - 2011	370	
Birth sex ratio, M:F	100:104	
Natural increase	0.75	%
Crude Birth Rate (CBR), 2007 – 2011	15.8	per 1,000
Crude Death Rate (CDR), 2007 – 2011	8.3	per 1,000
Total Fertility rate, 2007 – 2011	2.8	per woman
Life Expectancy at birth, 2007 – 2011		
• <i>Males</i>	70.1	
• <i>Females</i>	76.3	
Infant Mortality Rate (IMR), 2007 – 2011	8.1	per 1,000
Under 5 Mortality (U5M), 2007 – 2011	16.1	per 1,000
Adult Mortality, 2007 – 2011		
• <i>Males</i>	15.8	%
• <i>Females</i>	7.8	%
NCD Mortality, 2007 - 2011	4.3	%
Leading causes of death		
• <i>Under 5</i>	Perinatal Conditions	
• <i>15 – 59</i>	External Causes	
• <i>60+</i>	Non-Communicable Diseases	

## **EXECUTIVE SUMMARY**

The main purpose of this report is to make available the vital statistics and cause of death measures for Niue as derived from locally collected data. This is the first demographic report on vital statistics with data provided from the national civil registration systems (Births and Deaths registrations) 1987 – 2011). Information on the country's population structure and population a process, of which vital statistics is an integral part, is critical information for planners and decision makers. It is also key information for the health sector, and is critical for evaluating health priorities and setting health policy.

Niue's population at the time of the 2011Population and Household Census (10<sup>th</sup> September) was 1611 people, of whom 1460 considered Niue to be their place of usual residence.

Niue's crude birth rate (CBR) for the most recent years (2007 – 2011) was 15.8 per 1000 population (95% CI: 10.2 – 23.6) and crude death rate at 8.3 per 1000 population (95% CI: 4.1 – 13.9). Niue had an annual average 23 births and 12 deaths in the period of 2007 – 2011.This equates to a natural increase rate for Niue's population for 2007 – 2011 of 0.75%, which represents Niue's overall population growth were it not for migration. This has increased from the last census which recorded a natural increase rate at 0.65%. The sex ratio for babies born came to 104 females for every 100 males.

Niue's current total fertility rate (2007 – 2011) is estimated to be 2.8 (95% CI: 0.8 – 6.8). This is almost similar to the reported TFR from the 2006 Census which reported an estimated TFR at 2.6. Life expectancy at birth for men is estimated at 70.1 (95% CI: 63.8 – 71.8), much lower than for women with a life expectancy of 76.3 (95% CI: 72.9 – 79.7), although both measurements are subject to significant uncertainty due to the small populations size.

Infant mortality is estimated at 8.1 with a total of 1 infant death to 124 births within the period of 2007 – 2011.

The leading causes of deaths for Niueans are heart diseases contributing to 30% of deaths in 2007 to 2011. This was followed by respiratory diseases at 21% and cancer at 19%. This pattern of causes has not changed substantially over the 15 years of analysis.

However when disaggregated into age groups the leading cause of deaths in males aged 15 to 59 was external causes (accidents and injury), most of which were due to Suicide. Although the number of deaths is small terms of absolute numbers, based on population size these represent a significant public health issue.

## **INTRODUCTION**

Vital Statistics are the information maintained by a government, recording the birth and death of individuals within that government's jurisdiction. These data or statistical information is not only used by government and public health to provide evidence based policy and decision making but also to evaluate how effective their programs are. They are the cornerstone of public health systems today.

Recording and collating information on births and deaths is important for 2 major reasons. The first is to assign legal status to an individual. Birth registration ensures access to key rights such as education, citizenship and travel documents; while death registration facilitates legal processes for families such as land titles and access to bank accounts. Death registration is also critical for removing people from official government lists such as electoral rolls. The second key reason recording of births and deaths is important, is that it provides critical statistical information for planning and policy decisions. This includes population numbers; identifying service needs (such as the number of children being born) and perhaps most critically, is vital to measuring the health of a population.

Vital statistics plays an important role in shaping the economic and social development and also can be the direct result of development. Therefore we cannot overemphasise its importance in policy and decision making for the needs of the population. This report is the analysis of Niue's births and deaths from 1987 to 2011. Data was provided by the Health Department and the Department of Justice Lands and Survey and the records from the National Statistics Office. This is the first demographic report on vital statistics and causes of death with data provided from the national civil registration systems (Births and Deaths registrations) 1987 – 2011.

The main reporting of the population structure and processes of Niue is normally done every 5 years based on the analysis of the Population Census. This 5 year period is considered a bit lengthy if one is to take into account the dynamics of the population and the changes of it from time to time. Although statistical updates have been produced annually by the Niue Statistics office, these have in general included raw numbers with no further analysis of mortality and fertility indicators or evaluation of trends overtime. Following a workshop on Strengthening Vital Statistics in September 2011 in Suva, Fiji, a consultant from the Secretariat of the Pacific Community, SPC, aided Niue in evaluating over 20 years' worth of vital data, deaths and births.

Some new developments from the workshop were considered and carried through. One of them is the implementation of International Standards of Cause of Death Coding (ICD). This was an important achievement from the workshop as Niue had deaths that were not coded to international standards. Niue has since adopted the short-listed (General Mortality list 1 – 103 causes) version of the ICD-10 coding rules for mortality, including the selection of cause of deaths. This was more practical as due to Niue's small number of events and would provide enough detail for policy and decision makers and avoiding disaggregating data to such small numbers that would have no meaning whatsoever. The use of ICD list of 103 Causes is still comparable internationally with countries with full ICD-10 coding.

## **METHODS**

Data for 1987 to 2011 was obtained from the records that were at the Statistics Office, births and deaths and the Civil Registry Records. Birth records of the Statistics Office were compared to the records of the Civil Registrar that is kept with the Department of Justice Lands and Survey. In 2004, Cyclone Heta destroyed the only hospital in Niue, Lord Liverpool Hospital, as well as the Departments of Justice Lands and Survey. Some records kept at the old Department of Justice Lands and Survey were destroyed also.

However some birth and death records and certificates survived and the database was updated for this report. Data collection procedures are outlined in Appendix 4.

All birth and deaths in Niue are required to be registered at the Civil Registrar at the Department of Justice Lands and Survey. Births that occur off-island are also able to be registered up to the age of age 2 years.

Data from the civil registry and health were reconciled by the Statistics Officer in with assistance from the consultant from the Statistics for Development Program, SPC. Upon request all births, deaths and marriage data is sent from the Civil Registrar, Department of Justice Lands and Survey, to the Statistics Office and every half year for the usual vital statistics reporting. In order to ensure that no known deaths were missed, and all data was reviewed for quality by examining for gaps in the data over time, age-specific mortality patterns, and reviewing ill-defined deaths.

Population data by age and sex was derived from the censuses in 2001, 2006 and 2011, with data for 2000 - 2010 extracted from SPC population table [SPC, 2011]. As there were no existing population projections by age and sex for the years between 1987 and 2000 estimates were generated using exponential growth rates interpolated from the census in 1988, 1991, 1996 and 2001 for each 5 year age group by sex. The proportion of population in each sub-category was then multiplied by the projected total population [SPC, 2011] for these years to obtain population by age and sex.

For this analysis, only events in the resident population have been counted. This has been done as the population of primary interest to decision makers is those people who usually live in Niue and therefore use government services, and are affected by the prevailing social, economic and environmental conditions in Niue. In other words, this is the population for which governments need to provide services, and for whom the governments can influence exposures. Resident births and deaths are defined as follows:

### ***Resident Births***

Legally, all births in Niue are required to be registered. Niueans who give birth overseas are also able to register the birth of their child in Niue when they return up to the age of 2 years. Although there is no clear legal precedent, there has also been several cases where a baby born overseas has been adopted by parents in Niue and the birth subsequently registered.

For this analysis, only births to “resident” mothers have been counted. This has been done as the population of primary interest to decision males is those people who usually live in Niue and therefore use government services, and are affected by the prevailing social, economic and

environmental conditions in Niue. In other words, this is the population for which governments need to provide services, and for whom governments can influence exposures.

Resident births have therefore been defined in this as all registered births, where the child was either born in Niue, or where the mother had lived within Niue at the time she became pregnant and the child returned to Niue within 12 months of birth.

A total of 8 births were excluded from the registered data as they were adoptions from mothers not living in Niue.

Reporting procedures are currently being reviewed to use immunisation records to identify off-island births to resident mothers, where the parents have chosen not to register the birth in Niue (as this is optional) to ensure all births to the resident population are captured. This however has not been done for inclusion in this data set.

### ***Resident Deaths***

As for births, this analysis has focused on deaths in the resident population of Niue. All deaths in Niue are registered; however there may also be a significant proportion of deaths in the resident population that occur overseas. Most medical referrals are to New Zealand. Nearly all residents of Niue who die overseas are returned to Niue for burial and are therefore registered. In some cases, a Niuean who has lived overseas for many years and dies may also be returned to Niue for burial and subsequently be registered.

This analysis has included all registered deaths (both on and off island) excluding registered deaths where the person died overseas and had been out of the country for more than 12 months prior to death. Niue keeps a population register by which it is possible to check this information starting 2011 Population and Household Census.

Niuean residents who die overseas (for example having been referred to New Zealand for medical treatment) but who are not returned for burial have not been included in this analysis as the deaths are difficult to track. Suggestions have been made to request data from New Zealand, however Statistics New Zealand has noted that place of residence is often not recorded well in their collection. For example, place of residence may be recorded as a relative's place in New Zealand where the deceased had been staying while in New Zealand rather than their permanent home in Niue. As such, it is not possible to use the New Zealand data to accurately monitor deaths of Niue residents in New Zealand. Reporting processes in Niue are being reviewed to establish whether some of these deaths can be tracked through the medical referral program, however as most residents are buried in Niue, the discrepancy between the total number of deaths in residents of Niue and those who are ultimately registered as deaths in Niue should be very small.

The revised definitions mean that numbers of births and deaths may vary slightly from previously published analysis.

In order to minimise instability in the figures due to the small size of Niue's population and subsequently the risk of misleading interpretation, data has been aggregated over 5 year periods for calculation of all rates and trend analysis. Rolling averages have also been presented to examine trends over time.

Age-standardisation for mortality was done using the most recent 5 year period (2007 – 2011) as the standard, in order to examine changes in mortality trends separately from any changes in the population age structure.

Life tables were calculated using from empirical data [Chiang, 1968], and were also smoothed for missing data using Modmatch (which uses the WHO modified logit system of model life tables [Murray et al 2003]. Although a number of the life tables had missing values (i.e. no deaths recorded in specific age groups) when tabulated by 5 year time period and sex, work on small area calculations of life expectancy from the UK has indicated that missing values have a minimal effect on final estimates provided that the missing values do not occur in the oldest age groups [Williams & Eayres, 2004]. Confidence intervals, based on the variance of probability of surviving, were also calculated using the Chiang Method [Chiang 1967].

Cause of death data was extracted from the medical certificate of death and was tabulated by Department of Health Staff and Statistics office to the general Mortality List 1 (103 causes) of the International Classification of Diseases v10 [WHO, 2012], seen in Appendix 2.



## BIRTHS

### 1.1 TOTAL BIRTHS

Between 19 and 50 live births were reported to Niuean residents each year from 1987 to 2011. The highest number of births (50 babies) occurred in both 1987 and 1990, with the lowest number of births (19) in 2008.

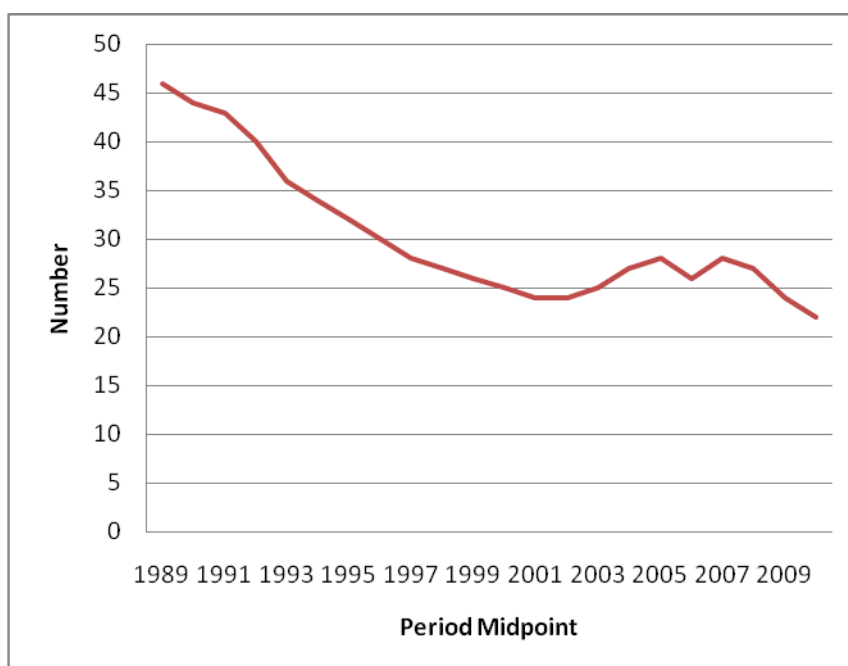
*Table 1.1: Total Number of Births by Sex per year: 1987 - 2011*

YEAR	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
F	25	19	26	23	21	17	20	15	15	14	16	16	11	15	13	16	17	10	14	22	15	7	17	9	14
M	25	25	23	27	16	26	18	18	15	14	17	14	11	10	10	9	9	13	16	12	13	12	13	16	8
TOTAL	50	44	49	50	37	43	38	33	30	28	33	30	22	25	23	25	26	23	30	34	28	19	30	25	22

*Table 1.2: 5 year period of Average Number of births*

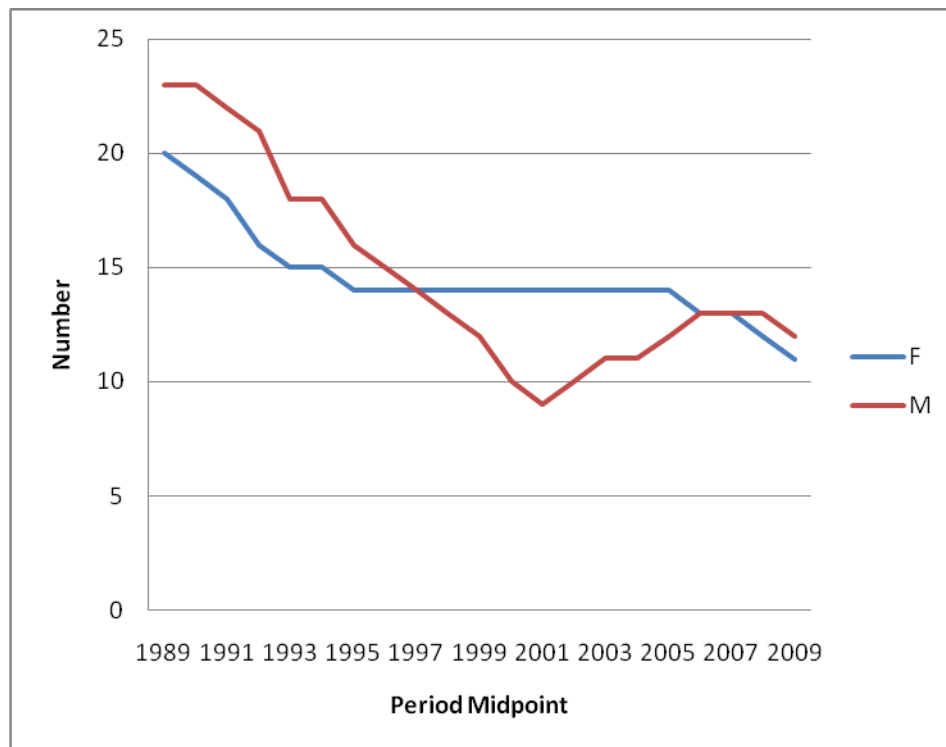
5 Year	1987-1991	1992-1996	1997-2001	2002-2006	2007-2011
F	22	16	14	15	12
M	23	18	12	11	12
T	46	34	26	27	24

*Figure 1.1: 5 Year Rolling Average for Total Number of Births in Niue: 1987 – 2011*



There was a sustained decline in the number of births per year through to the 2000's when this stabilised, before again declining in the late 2000's (Figure 1.1). The decline in the number of births is most likely due to the decreasing population of Niue (see statistical appendix 1) and subsequently fewer women of child bearing age (and their partners). This is reflected in the relative stability of the crude birth rate and fertility rates shown in the following sections.

Figure1.2: 5 Year Rolling Average of Birth by Sex in Niue: 1987 – 2011



Of the total live births between 1987 and 2011 there were 407 female babies and 390 male babies born, giving an approximate male-female sex ratio of 104 females for every 100 males born.

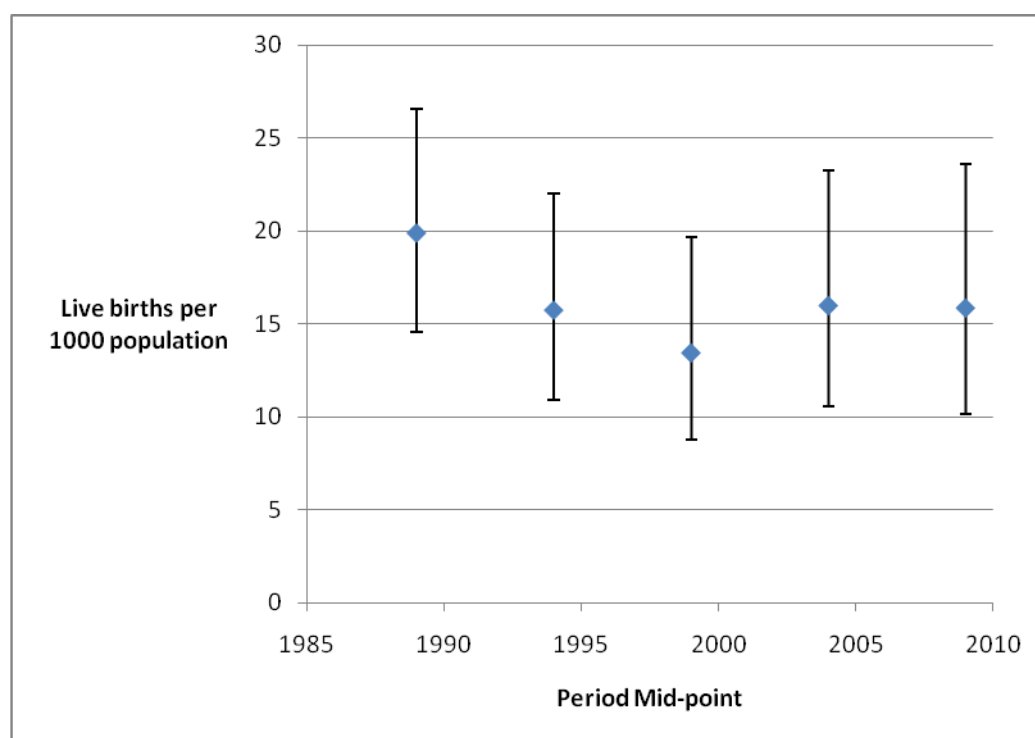
## 1.2 CRUDE BIRTH RATE

The Crude Birth Rate (CBR) indicates the number of live births occurring during the year, per 1,000 person-years. Niue's CBR it has decreased from 19.9 live births per 1,000 population in 1987 - 1991 to 15.84 live births per 1,000 population in 2007 – 2011. This is consistent with the crude birth rate of 15.8 for period of 2001 – 2006 reported in the 2006 Niue Census[Niue Census, 2006]. This is only slightly higher than CBR's for Australia (13.0 births per 1,000 population in 2010) and New Zealand (14.8 births per 1,000 population in 2010) [WHO, 2012].

*Table 1.3: Crude Birth Rate with 95% Confidence Intervals by 5 year period: 1987 – 2011*

5yr Period	1987-1991	1992-1996	1997-2001	2002-2006	2007-2011
CBR	<b>19.9</b> (14.6 - 26.5)	<b>15.7</b> (10.9 - 22.0)	<b>13.4</b> (8.8 - 19.7)	<b>16.0</b> (10.5 - 23.2)	<b>15.8</b> (10.2 - 23.6)

*Figure 1.3: Crude Birth Rate with 95% Confidence Intervals*



Although there has been a decline in the CBR since 1987-1991, there has been no significant change in CBR over the period reported. These wide confidence intervals reflect the uncertainty in these calculations due to the small population size, even when aggregated over 5 years.

### 1.3 FERTILITY RATES

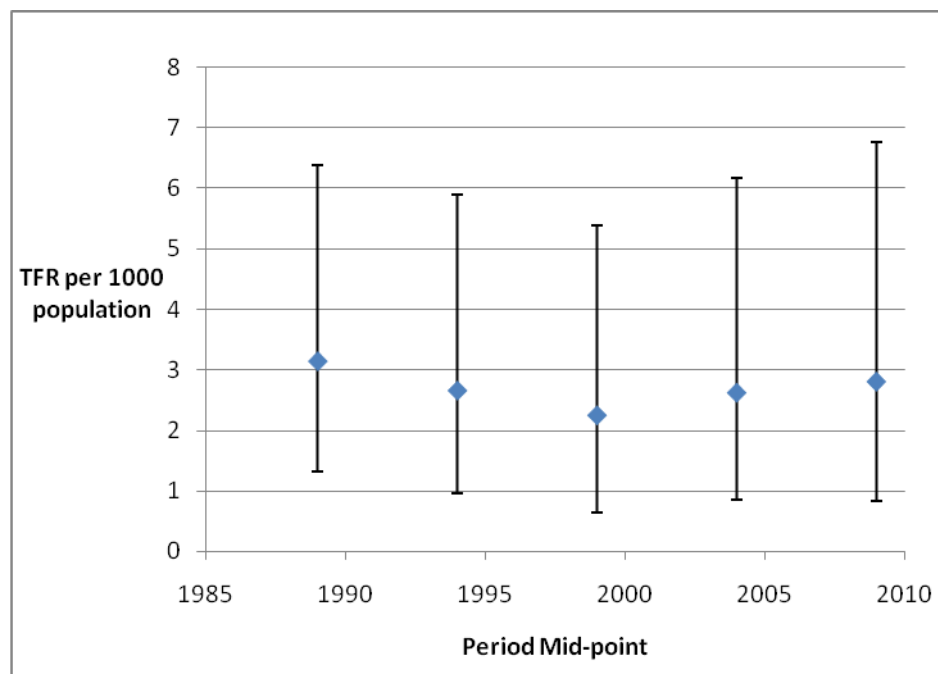
The total fertility rate is a measure of how many children a woman would give birth to on average during her reproductive life (15 – 49 years of age) if she were subject to present age specific-fertility rates [WHO, 2012] and pattern during their entire reproductive life. Populations become older with falling birth rates, because these reduce the proportion of children.

The total fertility rates for each period are shown below. These are consistent with TFR as reported in the 2006 Census [Niue Census, 2006].

*Table 1.4: Total Fertility Rates (Lower – Upper 95% Confidence Intervals) for Niue 1987 – 2011*

5yr Period	1987 - 1991	1992 - 1996	1997 - 2001	2002 - 2006	2007 - 2011
Fertility Rates	<b>3.1</b> (1.3 - 6.4)	<b>2.7</b> (1.0 - 6.0)	<b>2.7</b> (0.6 - 5.4)	<b>2.6</b> (0.9 - 6.2)	<b>2.8</b> (0.8 - 6.8)

*Figure 1.4: Total Fertility Rates with 95% Confidence Intervals*



The graph above shows Niue's fertility rates have been fairly steady through 1987 – 2011 with a total fertility rate of 2 to 3 births per woman. As shown in figure 1.4 the confidence for each 5 year average has increased and this is due to the uncertainty of the numbers.

The steady fertility rates indicate the continuing decline in Niue's population in the years of 1987 to 2011 is not due to the falling number of births.

Niue has a higher TFR than both New Zealand with a TFR of 2.16 [World Bank, 2012] and Australia with a fertility rate of 1.92 [World Bank, 2012], indicating that on average women in Niue will have more children over their lifetime than women in New Zealand or Australia.

## 1.4 PROPORTION OF BIRTHS BY AGE OF MOTHER

Child bearing age generally considered to be from 15 to 49 years of age [WHO, 2012]. Babies born to mothers outside this age range are possible but not common.

The table below shows the proportion of births by the age of mothers. In the year 1987 to 1991, there are a high percentage of births in the younger age group of 15 –29, in comparison to the years 2007 to 2011 which showed a higher percentage of more mothers giving births in the age groups of 30 to 44. One percent of mothers were under 15 years of age in the year 1997 – 2001 and 2002 – 2006 respectively.

No live births were recorded to mothers aged 50 or older.

*Table 1.5: Proportion (%) of births by Age of mother: 1987 – 2011*

Years	1987 - 1991	1992 - 1996	1997 - 2001	2002 - 2006	2007 - 2011
15 - 19	13	6	11	10	5
20 -24	27	25	22	27	24
25 - 29	29	35	32	25	25
30 - 34	21	18	20	23	27
35 - 39	7	11	11	12	15
40 - 44	3	5	4	1	3
45 - 49	0	0	1	0	1

*Figure 1.5: Proportion of Births by Age Groups of Mothers*

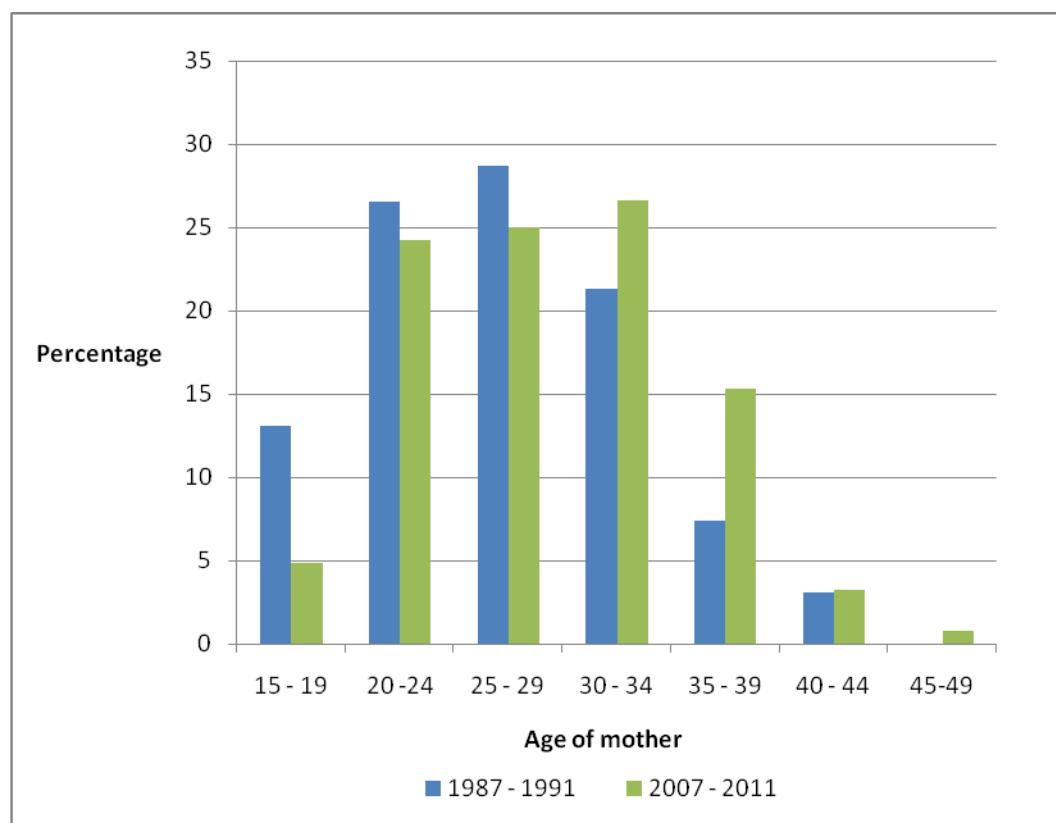


Figure 1.5 compares the proportion of births by age groups in two 5 year periods, 1987 to 1991 and the most recent 2007 to 2011. The graph illustrates a shift in pattern as more mothers are giving birth later on in their life time. This is shown from the increase in the number of mothers in the age groups of 30 to 45 in 2007 – 2011 in comparison to the number of young mothers in the age group of 15 to 25 in the year 1987 to 1991.

Births to teenage mother are of particular interest as these are associated with higher-than normal risk for complications during or after birth, for both the mother and the baby. Risks for medical complications are greater for adolescent girls as an underdeveloped pelvis can lead to difficulties in childbirths. Adolescent mothers face a higher risk of obstructed labour than women in their twenties [Aetna Inc., 2009]. The children of teens are more likely to be born premature and with low birth weight predisposing them to many other lifelong conditions. Stillbirths and death in the first week of life are 50% higher among babies born to adolescent mothers than to mothers 20 – 29 years old [Wikimedia Foundation Inc., 2012] [March of Dimes Foundation, 2009].

Maternal and prenatal health is of particular concern among teens that are pregnant or parenting. Many teenage mothers are subject to nutritional deficiency from poor eating habits common in adolescence, including attempts to lose weight. Because of their age and immaturity they are less likely to know what is happening and are less likely to receive prenatal care often seeking in third trimester [Aetna Inc., 2009].

Being a young mother also can get in the way of education and other life opportunities as most usually drop out of school. Pregnant adolescent are more likely to smoke and use alcohol than are older women, which can cause many problems for the child and after birth [Wikimedia Foundation Inc., 2012].

The number of births to adolescent mothers, those aged 15 to 19 has declined from the years 1987-1991 to 2007-2011, although it has fluctuated across this period and does not show a steady pattern of decline.

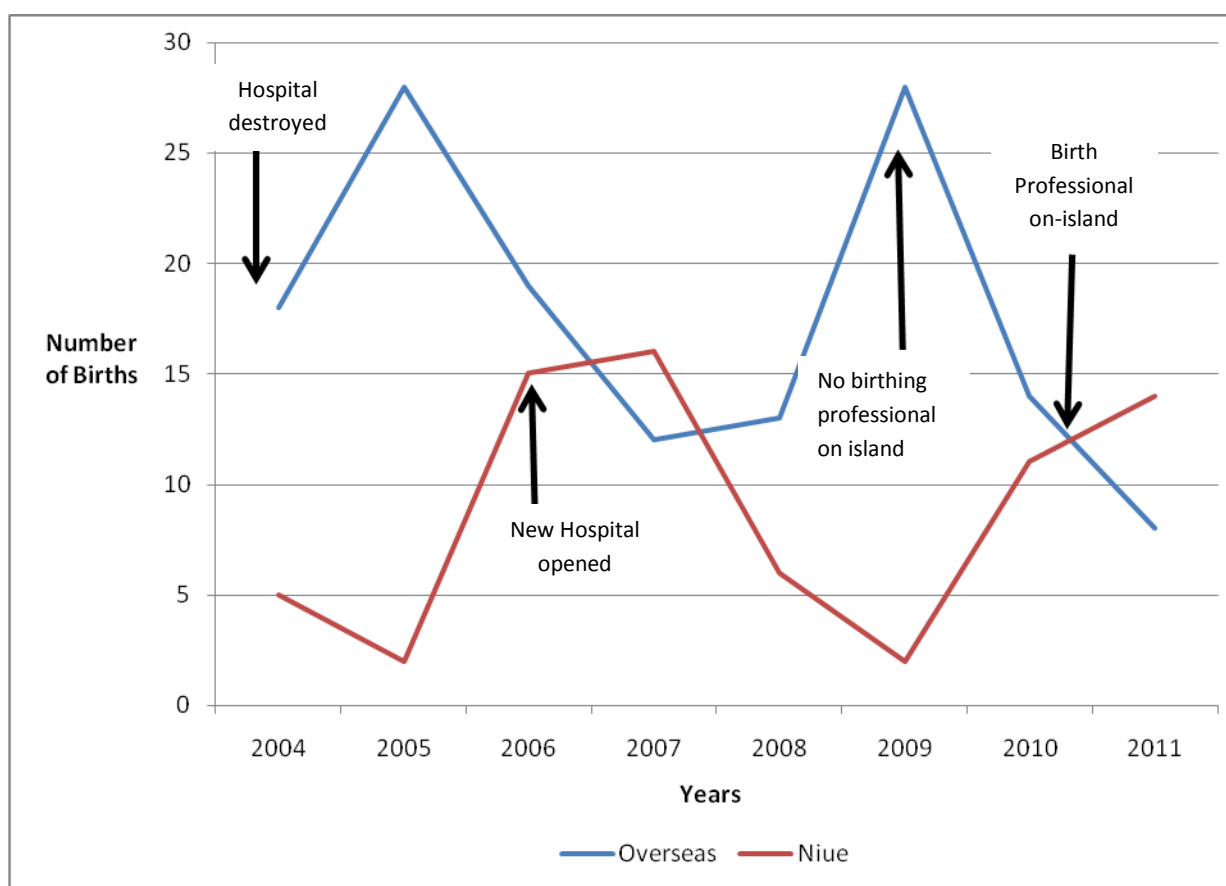
Although not shown in figure 1.5 there were also 2 births to mothers of less than 15 years of age of births between 1997 and 2007.

## 1.5 PLACE OF BIRTH

Many of the births to the resident population of Niue occur off-island. In Niue mothers have the option of planning to give birth in-country or in New Zealand. Niueans as New Zealand citizens are able to access specialised healthcare during pregnancy in New Zealand and to deliver their babies in a New Zealand hospital out of choice (for indigenous Niueans). Other residents may also be referred to New Zealand for specialised care under the medical referral scheme if warranted.

Figure 1.6 shows the total births by place of births for 2004 – 2011. Data prior to 2004 was poorly recorded in respect to place of birth and hence was not analysed.

*Figure 1.6: Total Births by Place of Birth (Niue or Overseas): 2004 – 2011*



Cyclone Heta hit Niue early 2004 destroying the only hospital on island, Lord Liverpool Hospital. A makeshift hospital was situated at the Niue Youth Centre, Fonuakula and was renamed Niue Health Centre for 2 years, from 2004 to 2005. Due to inadequate facilities and lack of equipment to cater for local deliveries mothers were referred overseas (i.e. Niueans to New Zealand and Tongans to Tonga) for safe delivery.

2006 saw the opening of the Niue Fook Hospital. The newly appointed Director of Health had a background in obstetrics and gynaecology and remained on island for the following 2 years. The new hospital provided a maternity unit that was fully equipped to cater for deliveries and an operating theatre for Caesarean Section (surgery) of complicated and high risk cases. Niue mothers had the option once again to give birth in Niue.

Referrals increased once again in 2009, as there was no Obstetrician on the island to attend in case of complications either during labour, delivery or post-delivery. A directive was verbally issued by the former Minister of Health to refer pregnant mothers to New Zealand for a safer delivery until the Department was able to recruit a new Obstetrician Doctor or a doctor with skills and experience in Caesarean Section. Locums with these skills were appointed in 2010 with a Senior Medical Officer skilled in Obstetrics and Caesarean Section appointed in 2012. Self-referral remained an option for those who preferred to give birth overseas.



# 1. DEATHS

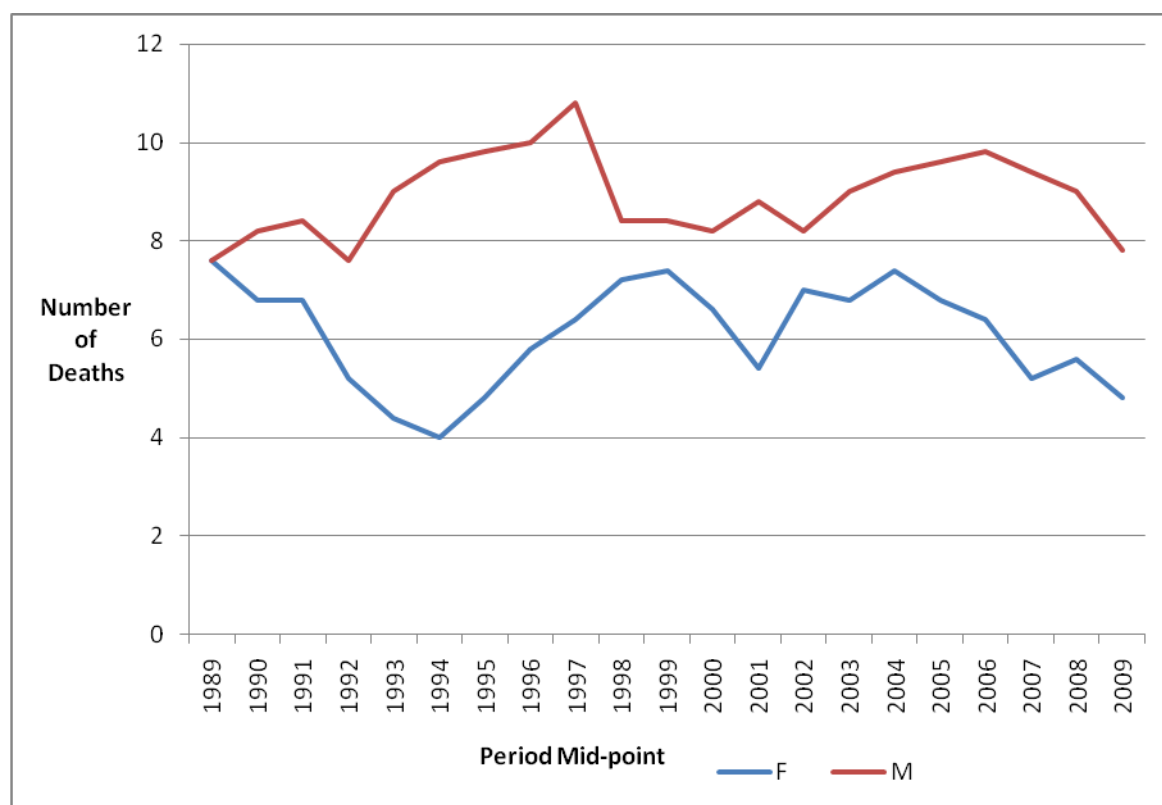
## 2.1 TOTAL DEATHS

There was a total between 8 to 20 deaths each year from 1987 to 2011. 1994 had a total of 8 deaths, 7 of which were men. In total there were more male deaths than females as shown on the graph below with 214 male deaths and 156 female deaths.

Table 2.1: Total Number of deaths by Sex: 1987 – 2011

YEAR	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
F	9	7	9	7	6	5	7	1	3	4	9	12	4	7	5	5	6	12	6	8	2	4	6	8	4
M	5	6	11	10	6	8	7	7	17	9	9	8	11	5	9	8	11	8	9	11	9	12	6	7	5
TOTAL	14	13	20	17	12	13	14	8	20	13	18	20	15	12	14	13	17	20	15	19	11	16	12	15	9

Figure 2.1: 5 Year Rolling Average of Number of Deaths in Niue: 1987 – 2011



The graph shows that there are more male deaths when compared to female deaths. The trend also shows a fairly constant average number of deaths throughout 1987 to 2011 with an average of less than 10 deaths for males and less than 8 deaths for females.

## 2.2 CRUDE DEATH RATE (CDR) AND AGE STANDARDISED MORTALITY RATE (ASMR)

The CDR for 2007-2011 was 8.3 deaths (95% CI: 4.1-13.9) per 1,000 population, and 9.9 deaths (95% CI: 5.4-15.3) per 1,000 population for 2002-2006. This is very similar to the CDR of 9.3 reported in the 2006 census for the period 2001-2006.

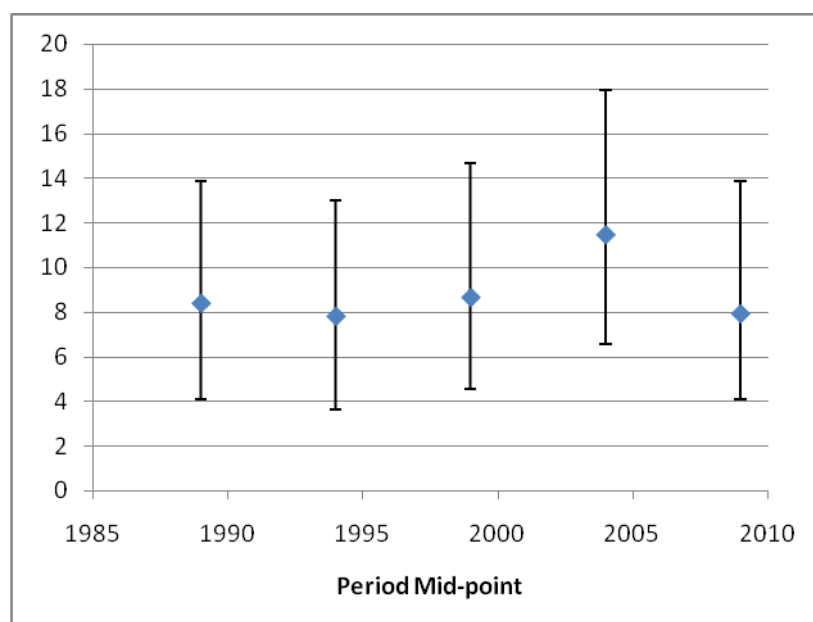
Although a slight increase in CDR is apparent from 1987-1991 to 2007-2011, this disappears when standardised to account for changes in the age structure of the population. As seen by the confidence intervals shown in table 2.2 and figure 2.2 – there were no significant changes in either CDR or ASMR over the period reported.

Both the CDR and ASMR were higher in 2002-2006, however as this increase was not sustained and given the wide uncertainty of these figures (as reflected in the 95% CI's), this is likely to reflect random variation due to the small population size despite the aggregation of data over several years.

*Table 2.2: Crude death rate & Age standardised mortality rate per 1,000 population with 95% Confidence Intervals.*

Year	Crude Death Rate	Age Standardised Rate
1987 - 1991	<b>6.6</b> (3.6 - 10.7)	<b>8.4</b> (4.1 - 13.8)
1992 - 1996	<b>6.3</b> (3.2 - 10.3)	<b>6.3</b> (3.6 - 13.0)
1997 - 2001	<b>8.2</b> (4.3 - 12.8)	<b>8.7</b> (4.6 - 14.7)
2002 - 2006	<b>9.9</b> (5.4 - 15.4)	<b>11.5</b> (6.5 - 18.0)
2007 - 2011	<b>8.3</b> (4.1 - 13.8)	<b>8.3</b> (4.1 - 13.8)

*Figure 2.2: Age Standardised Mortality Rates with 95% Confidence Intervals*



Niue's Crude Death Rate is slightly higher than both New Zealand's Crude Death Rate of 6.6 [World Bank, 2012] and Australia's Crude Death Rate of 6.4 [World Bank, 2012] however this is likely to be largely due to the younger age structure of the population in Niue rather than reflecting a significant difference in overall health status. This is supported by the high life expectancy estimated for Niue in Table 2.4.

## 2.3 AGE SPECIFIC MORTALITY RATE (ASMR)

As a general rule, in all settings, the mortality rates are high during infancy and early childhood and fall to their lowest levels between the ages of 5 and 14 years. Subsequently, mortality rates start to rise with increasing age and increase exponentially beyond the age of 35 or so.

The ASMR for Niue reflects this expected pattern. This is used as a measure of data quality and indicates that there are unlikely to be major biases or gaps in the reported data.

*Table 2.3: Age Specific Mortality Rate (deaths per 1,000 people) by agegroups and period*

Age	1987 - 1991	1992 - 1996	1997 - 2001	2002 - 2006	2007 - 2011
0-4	1.9	2.0	5.5	4.0	3.2
5 - 14	0.7	1.2	0.5	0.0	0.0
15 - 24	1.0	1.8	0.7	0.7	1.6
25 - 34	0.7	0.0	4.7	4.5	2.5
35 - 44	3.8	0.9	0.9	2.1	1.1
45 - 54	1.7	8.5	5.0	2.6	3.0
55 - 64	7.0	10.5	13.6	18.8	9.5
65 - 74	31.9	21.8	27.5	24.4	25.7
75+	118.6	95.2	96.5	191.7	122.7

*Figure 2.3: Age Specific Mortality Rates by 5 year period: 1987 – 2011*

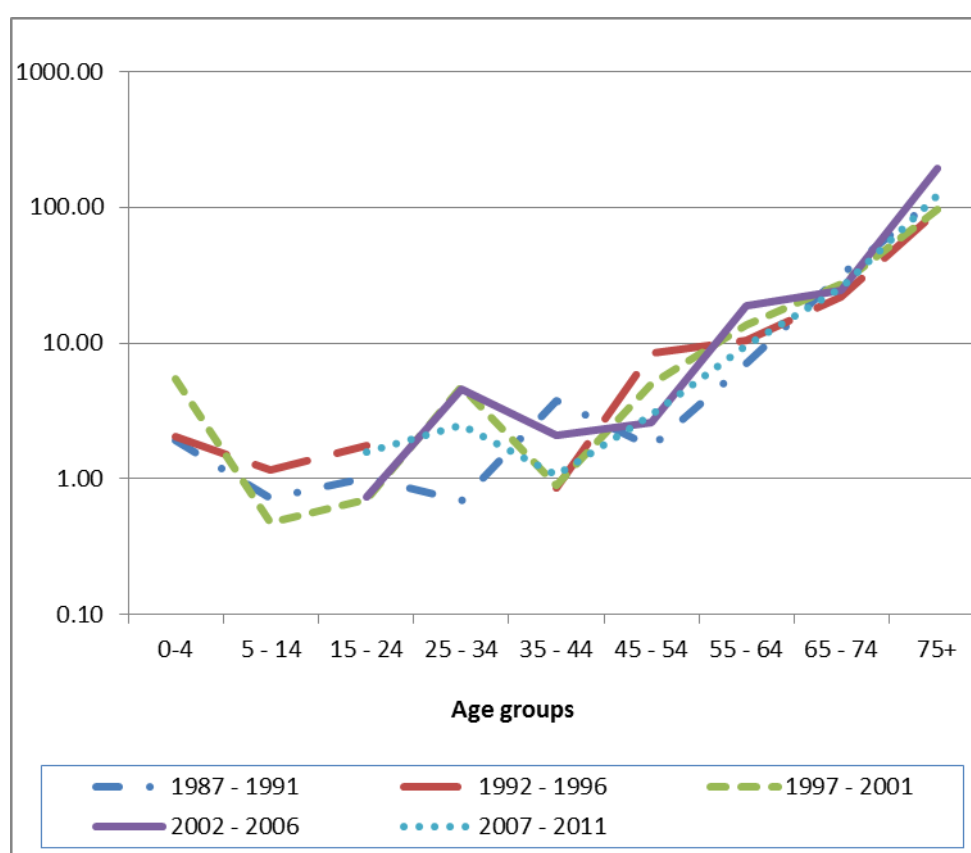


Figure 2.3 shows the age specific mortality rate for 5 year period beginning 1987 to 2011. Even though there is insufficient data, the graph still shows a plausible (age specific mortality rate) shape and as expected there is a high number of deaths in infants and the elderly. Most years show a rise in early adulthood which is consistent with the high external cause of deaths as shown on the Causes of Deaths Tables (Table 3.6). As the age of the person increases so does the trend. As shown from the ages of 55 onwards the age specific mortality rate increases and this is true as everyone dies of something.

## 2.4 AGE SPECIFIC MORTALITY RATE BY SEX

The Age specific mortality rates refer to the number of deaths per year per 1000 people of a given age. The graphs below show the Age Specific Rates by Sex for each 5 year period.

*Figure 2.4: Age Specific Mortality Rate by Sex: 1987 – 1991*

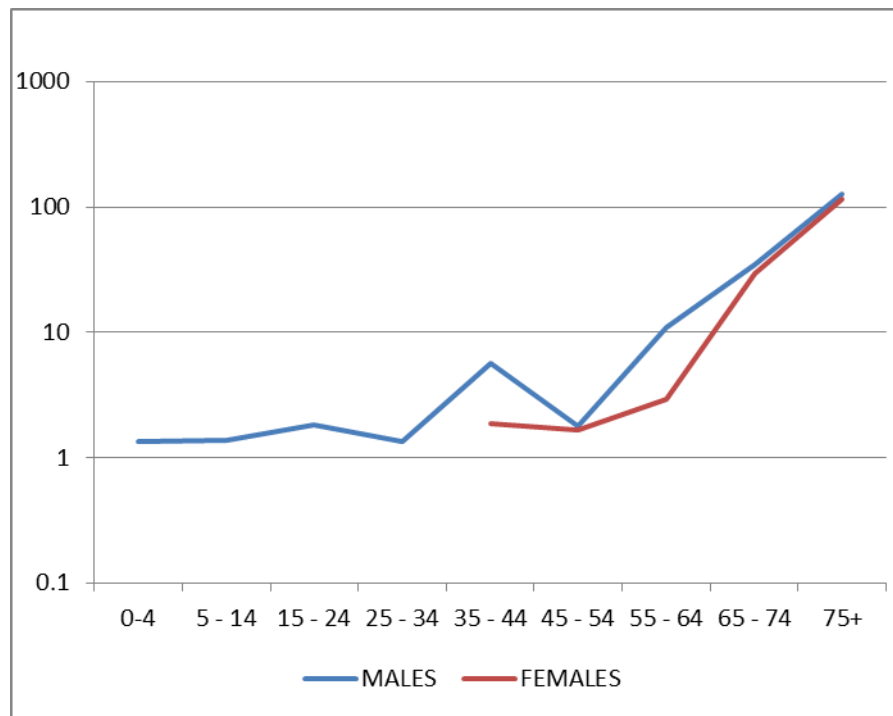


Figure 2.4 shows a plausible shape for the males. Not enough data for females and trend incomplete

*Figure 2.5: Age Specific Mortality Rate by Sex: 1992 – 1996*

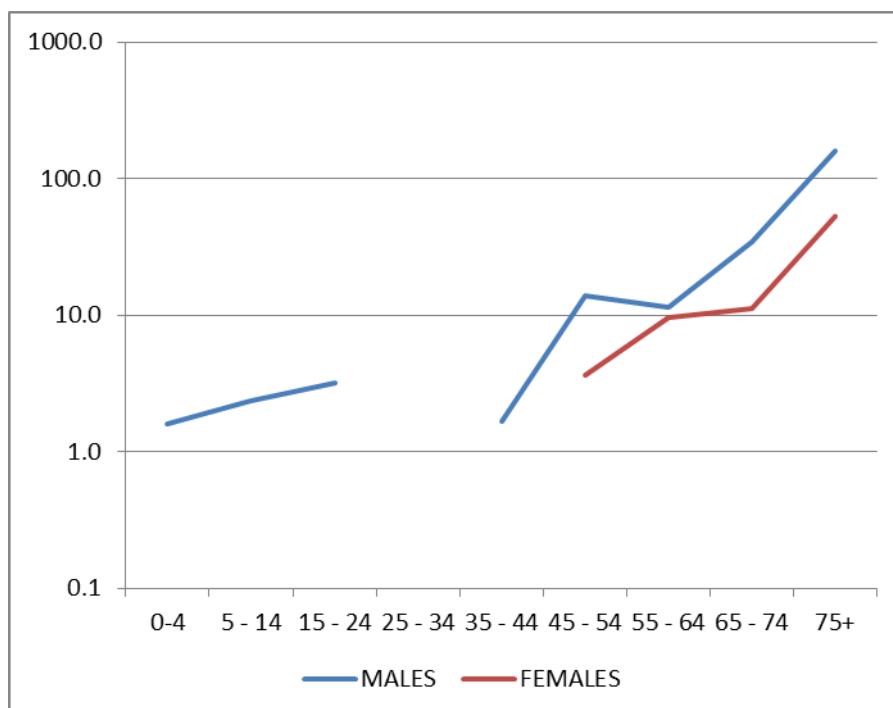
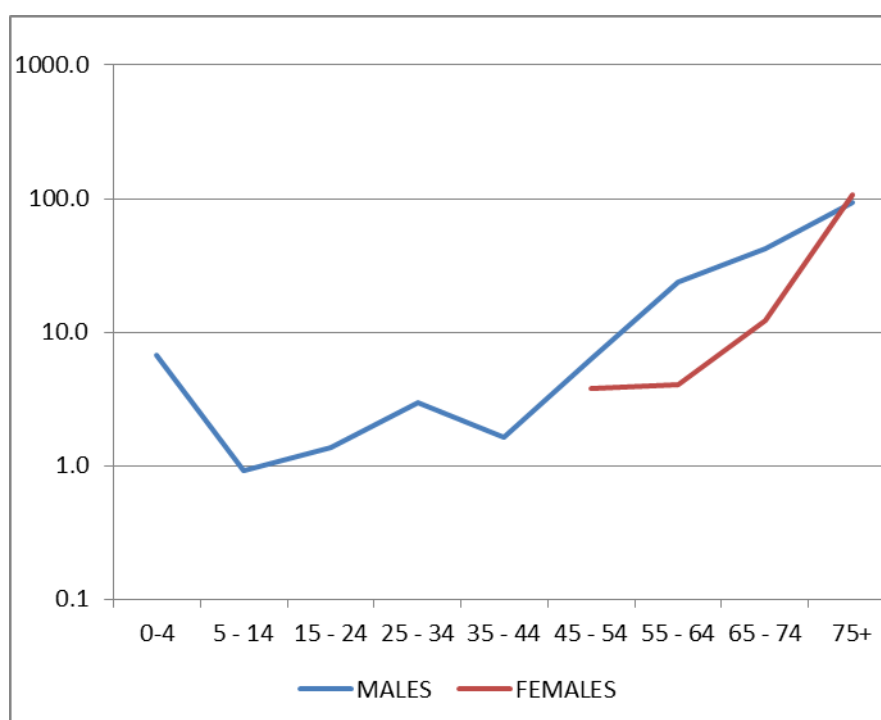


Figure 2.6: Age Specific Mortality Rate by Sex: 1997 – 2001



The ASMR graph for the year 1997 to 2001 (figure 2.6) shows a plausible trend for males. This is shown as there are more infant male deaths in the age groups of 0 – 4 years of age and a slight bump in the age group of 25 to 34. The trend is also consistent with cause of deaths in males in the age group of 25 – 34 where the main cause of deaths for males is external causes.

Figure 2.7: Age Specific Mortality Rate by Sex: 2002 – 2006

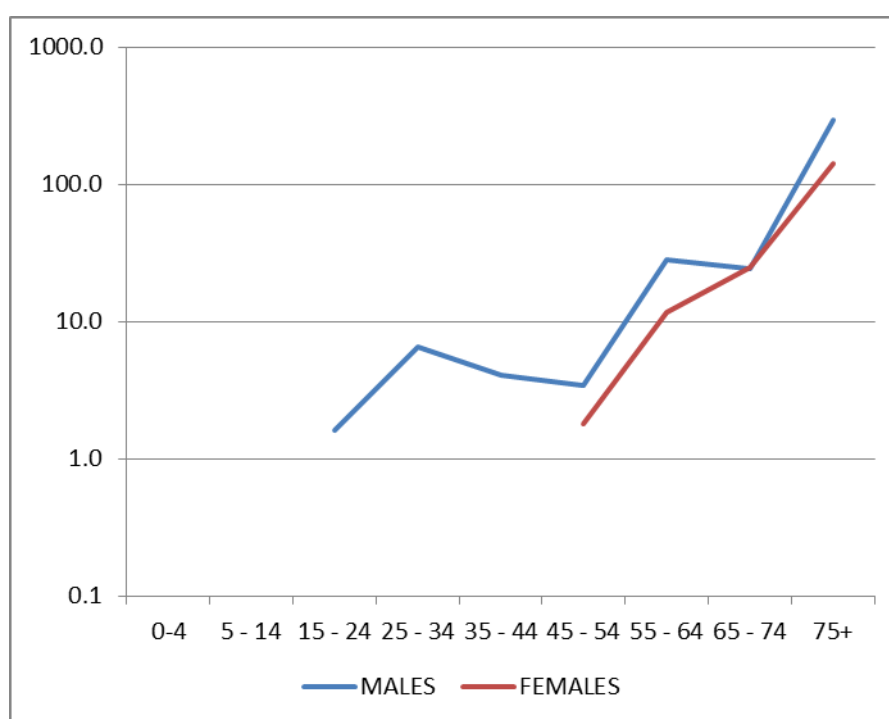
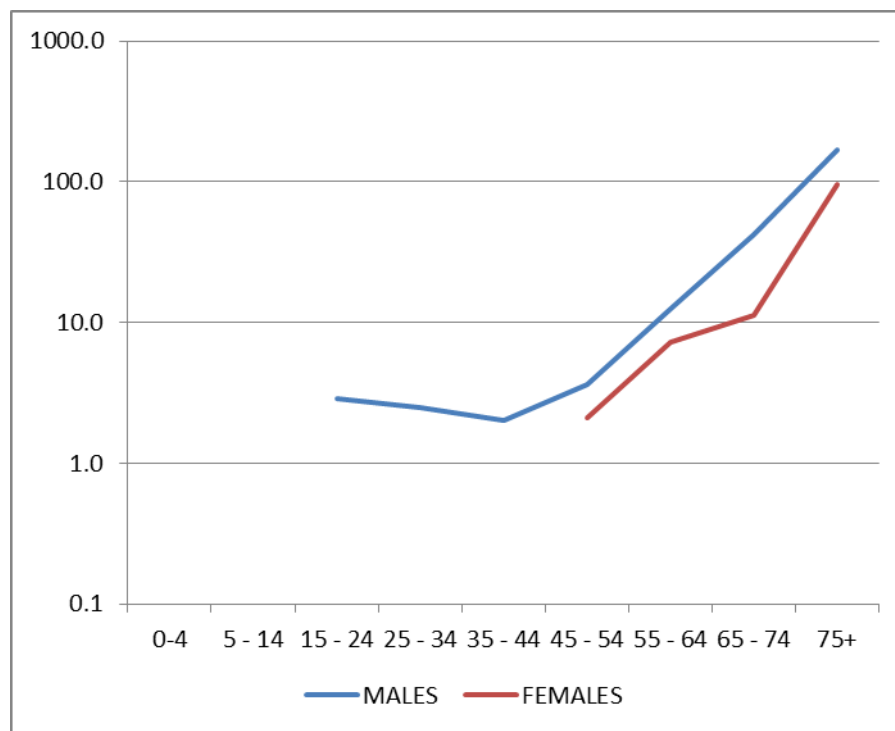


Figure 2.8: Age Specific Mortality Rate by Sex: 2007 – 2011



As noticeable in figures 2.4 and 2.8 the small population size, and subsequent low number of deaths (even when aggregated over 5 years) mean that it is not possible to obtain stable age-specific mortality rates for all age groups and great care must be taken when using these rates to calculate life tables. Despite this, for data available shows a plausible pattern in the age specific mortality rate graphs above.

The mortality rates are very low up to the age of about 15 years of age. However there is a small increase for males during the ages of 15 to 34 years due to accidents and other injuries. This is consistent with the causes of deaths in males in which external causes are the leading causes of death (see “Cause of Death”). The death rates only begin to rise in sharply after about age 55.

A similar bump may occur in females of reproductive ages (15 – 49) in settings where maternal mortality is high. In the case of Niue, there have been no reported maternal deaths in Niue, and subsequently there is no such “bump” in the female age-specific mortality for these age groups.

As shown in the graphs, male mortality rates are higher and this is true as men generally die younger than females.

## 2.5 LIFE EXPECTANCY AT BIRTH

The table below shows the Life Expectancy from birth for an average Niuean as calculated directly from recorded deaths, through 5 year periods beginning 1987 to 2011 (Table 2.4). Life expectancy for 2007 – 2011 is estimated at 70.1 (95% CI: 63.8 – 71.8) for males and 76.3 (72.9 – 79.7) for females. These figures are consistent with the LE estimated in the 2006 census using both empirical data and a variety of models to “smooth out” missing values [Niue Census, 2006] which estimated LE as 67 for males and 76 for females.

*Table 2.4: Life Expectancy Rate at Birth*

5 YEAR PERIOD	MALE	FEMALE	TOTAL
1987 - 1991	<b>71.1</b> (67.8 - 74.3)	<b>76.2</b> (74.1 - 78.3)	<b>73.4</b> (71.4 - 75.5)
1992 - 1996	<b>68.2</b> (65.5 - 72.0)	<b>77.1</b> (75.3 - 79.0)	<b>72.2</b> (70.7 - 74.7)
1997 - 2001	<b>67.2</b> (63.4 - 71.0)	<b>73.9</b> (70.1 - 77.7)	<b>70.3</b> (67.6 - 73.0)
2002 - 2006	<b>67.8</b> (63.8 - 71.8)	<b>74.0</b> (70.9 - 77.1)	<b>70.8</b> (68.1 - 73.4)
2007 - 2011	<b>70.1</b> (63.8 - 71.8)	<b>76.3</b> (72.9 - 79.7)	<b>73.1</b> (70.4 - 75.8)

There has been no apparent or sustained improvement in LE over the past 20 years, and this may warrant future investigation. Although improvement of LE is usually slow, and the estimates of LE for Niue must be interpreted with great care given the high level of uncertainty (as demonstrated in the age-specific mortality rates in the previous section), one would hope to see some moderate upward trend over time. For the most recent estimates, LE derived using modmatch (the WHO model life tables) in order to “smooth” the age-specific mortality curves to account for missing values due to the small population size, were within a year of the estimates derived from empirical data (without adjustments) and within the given confidence intervals, indicating that the empirical life tables derived directly from the recorded data to provide a plausible estimate for LE in Niue and can be used to monitor trends in LE over time. The modelled estimates (from modmatch program of WHO life tables) estimated LE for 2007 – 2011 as 71.3 years for males and 77.1 for females.

Niue has a lower LE for both males and females, when compared to counterpart countries, New Zealand and Australia. New Zealand’s LE (2011) for males is 78.8 and for females 82.7. For Australia the LE (2011) for males is 79.4 and for females 84.4 [Statistics New Zealand, 2012].



## 2.6 INFANT MORTALITY RATE (IMR)

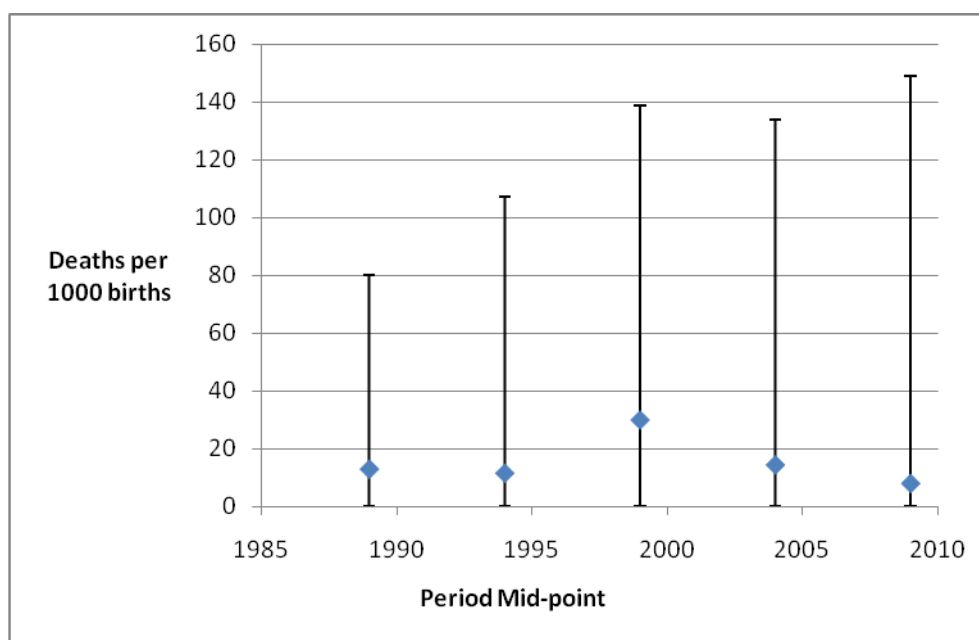
The Infant Mortality Rate shows the number of infant deaths a year per 1000 live births for a given period, or the probability that an infant will not reach their first birthday.

The 2006 census reported an Infant Mortality Rate of 7.8 deaths per 1000 live births for 2001-2006 [Niue Census, 2006] substantially lower than the 14.5 deaths per 1000 live births for 2002-2006 reported here. This substantial difference in reported IMR can be explained by the different case definitions used in the two reports, as in this study, only births to resident mothers have been included in the denominator rather than all registered births.

*Table 2.5: Infant Mortality Rates per 1000(Lower – Upper Confidence Intervals)*

5 Year Period	1987 - 1991	1992 - 1996	1997 - 2001	2002 - 2006	2007 - 20011
IMR	<b>13.0</b> (0 - 80.1)	<b>11.6</b> (0 - 107.2)	<b>30.1</b> (0 - 138.7)	<b>14.5</b> (0 - 133.7)	<b>8.1</b> (0 - 148.8)

*Figure 2.9: Infant Mortality Rate per 1000 with 95% Confidence Intervals: 1987 – 2011*



There are no overall trends apparent in IMR over the 20 years examined. Niue' infant mortality rate was substantially higher in the years of 1997 to 2011 than the periods either before or after, with an IMR of 30.18 deaths per 1000 live births. However this again is likely to reflect natural variation due to the small population size, as there were 4 infant deaths between 1997 and 2001, 3 cases due to severe prematurity and 1 severe abnormality. Generally sitting below 15 deaths per 1000 live births (except in 1997-2001), IMR is fairly low. This is consistent with high standard of living and good quality medical care. Further reductions in IMR are likely to require significant (and possibly unwarranted) investments in specialised care. In comparison the Infant Mortality Rate for New Zealand was 4.8 deaths per 1000 live births in 2010 [The World Bank, 2012].

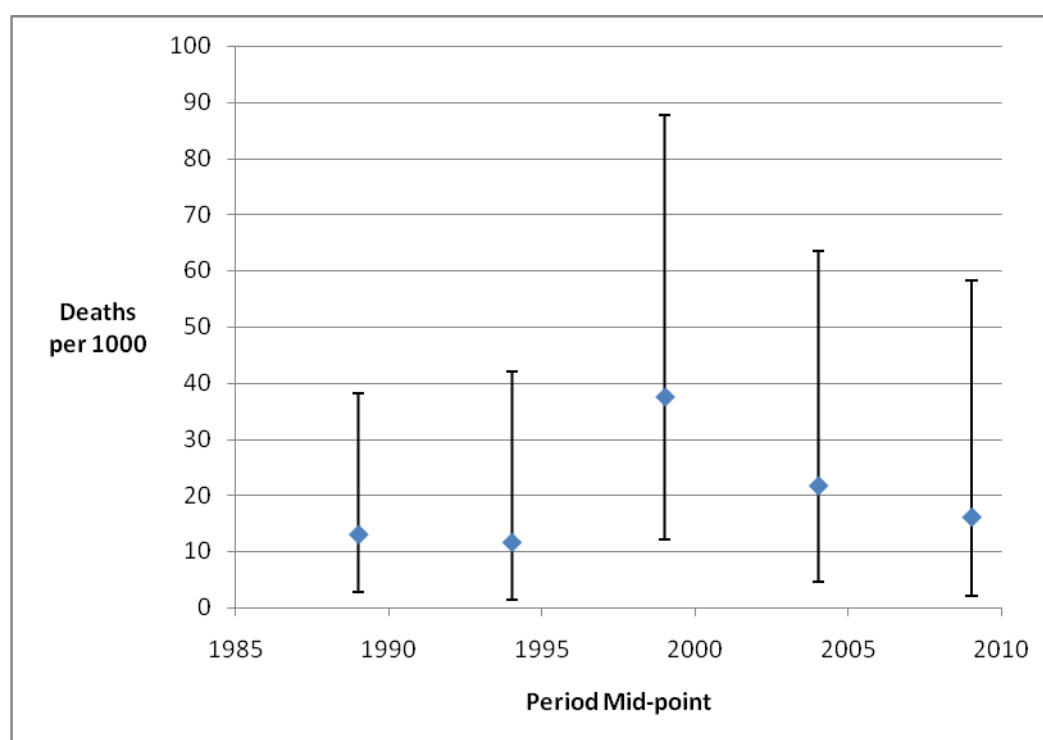
## 2.7 UNDER 5 MORTALITY RATE (U5M)

Under 5 Mortality Rate is the probability per 1000 that a new born baby will die before reaching the age of five. Niue's U5M increased in 1997 to 2001 reflecting the increase in IMR discussed above, and from there has been declining to a recent 16.1.

*Table 2.6: Under 5 Mortality Rate per 1000 (Lower – Upper 95% Confidence Intervals)*

5 Year Period	1987 - 1991	1992 - 1996	1997 - 2001	2002 - 2006	2007 - 20011
U5M	13.0 (2.7 - 38.1)	11.6 (1.4 - 42.0)	37.6 (12.2 - 87.7)	21.7 (4.5 - 63.5)	16.1 (2.0 - 58.3)

*Figure 2.10: Under 5 Mortality Rate per 1000 with 95% Confidence Intervals: 1987 -2011*



When aggregated over 5 years, under 5 mortality in Niue is shown to have increased slightly, since the earliest period as shown in the graph, although there are no clear trends. This however primarily reflects a growing level of uncertainty in the figures (95% confidence intervals are shown as the upright bars) due to a substantial decline in the overall number of births resulting in smaller denominator when calculating IMR and U5M rather than a true increase in childhood deaths. These figures clearly demonstrate the potential for uncertainty due to small numbers even when aggregated over several years, and the need for data interpretation when reporting mortality measures for policy.

Overall, U5M in Niue remains relatively low. In comparison, the New Zealand under 5 mortality rate which is 6 deaths per 1000 live births [The World Bank Group, 2012].

## 2.8 ADULT MORTALITY

Table 2.7 below shows the probability in percentage of males and females dying between the ages of 15 to 59 inclusive.

Between the years of 1987 –1991 the probability dying between 15 and 59 years of age for males was 14.7%, that is 15 out of every 100 15 year old males would not make it to 60 years of age. This equates to an 85% probability of surviving. This is very high when compared to females who had a probability of dying between the ages of 15 and 59 of 4.8% with 95.2% of surviving. The probability of a female dying between 15 and 59 increased to 7.8 for the most recent years of 2007 – 2011. Male adult mortality for 2002-2006 was very high at 24.9%. This decreased to a 15.8% in 2007 - 2011. Overall there was no clear increase or decrease over time for either sex, however premature adult mortality in males remains very high and should be further examined. This is consistent with the high cause-specific mortality attributed to external causes noted later in this report.

*Table 2.7: Adult Mortality in Percentages*

5 YEAR PERIOD	MALES	FEMALES
1987 - 1991	14.7	4.8
1992 - 1996	21.5	8.0
1997 - 2001	20.9	11.7
2002 - 2006	24.9	9.1
2007 - 2011	15.8	7.8

## **2. CAUSES OF DEATH**

Causes of Death are reported for the years 1996 to 2011 only. The previous years of data show no records of cause of deaths and thus were excluded from the analysis. Niue has recently introduced routine tabulation of deaths according to the General mortality list (103 Cause List) of the International Statistical Classification of Diseases and Related Health Problems, 10<sup>th</sup> division (ICD 10v2) [WHO, 2012], however due to small number of deaths, causes are reported here by ICD chapter.

There were a total of 131 deaths from the period of 1987 to 1995 with no records of the cause of death. These records were kept with the birth and deaths registration book within the Niue Statistics Office. For the years that do have Cause of Death recorded there were a total of 15 ill-defined deaths and 23 deaths where records of death were not available for coding when coded to the ICD-103 cause list. However the number of ill-defined deaths and not available (NA) data declined for the past 15 years and most deaths are recorded according to the standard.

The following tables and graphs are the categorised total causes of deaths for Niue in 5 year periods and are graphed at midpoint periods (NA and Ill-defined are not included).

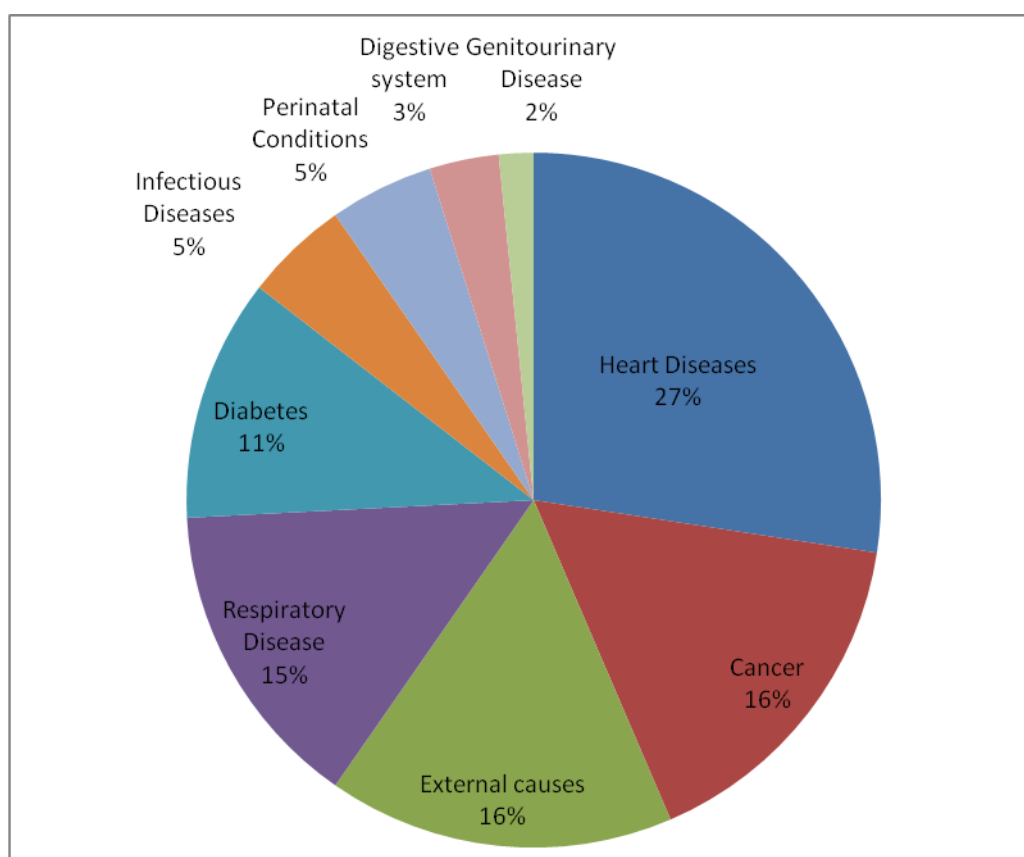
### 3.1 CAUSES OF DEATHS

In the years 1997 to 2001 the leading causes of deaths in Niue was Heart Disease (27%), Cancer (16%), External Causes (16%), Respiratory Diseases (15%) and Diabetes (11%).

Table 3.1: Leading Causes of Deaths: 1997 – 2001

CAUSES OF DEATH (1999)		
Heart Diseases(1-064)	17	27%
Cancer(1-026)	10	16%
External causes(1-095)	10	16%
Respiratory Disease(1-072)	9	15%
Diabetes(1-051)	7	11%
Infectious Diseases(1-001)	3	5%
Perinatal Conditions(1-092)	3	5%
Digestive system(1-078)	2	3%
Genitourinary Disease(1-084)	1	2%
Blood Disease(1-048)	0	0%
Skin Disease(1-082)	0	0%
Congenital Abnormalities(1-093)	0	0%
Total	62	100%

Figure 3.1: Proportional Mortality by cause of Death: 1997 - 2001

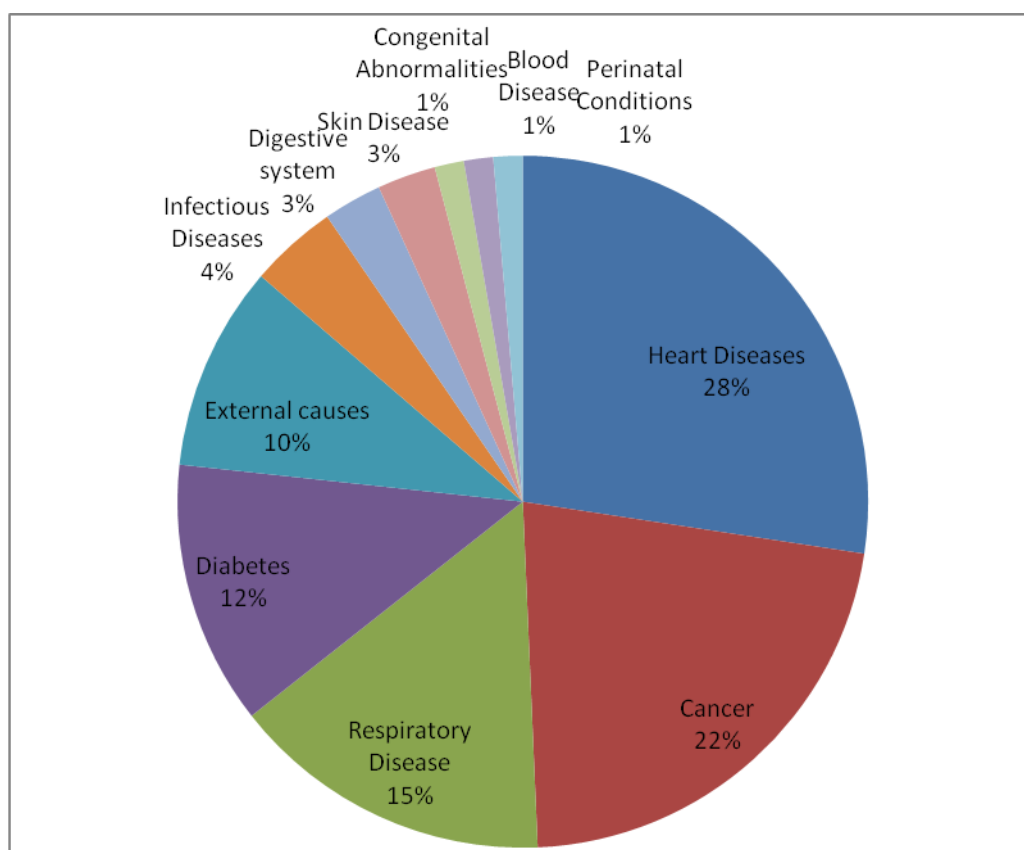


2002 to 2006 also show similar leading causes of deaths with Heart Diseases (28%), Cancer (22%), followed by Respiratory Diseases (15%) and Diabetes (12%). There is a decline in External causes (10%).

Table 3.2: Causes of Deaths: 2002 – 2006

CAUSES OF DEATH (2004)		
Heart Diseases(1-064)	20	28%
Cancer(1-026)	16	22%
Respiratory Disease(1-072)	11	15%
Diabetes(1-051)	9	12%
External causes(1-095)	7	10%
Infectious Diseases(1-001)	3	4%
Digestive system(1-078)	2	3%
Skin Disease(1-082)	2	3%
Blood Disease(1-048)	1	1%
Perinatal Conditions(1-092)	1	1%
Congenital Abnormalities(1-093)	1	1%
Genitourinary Disease(1-084)	0	0%
Total	73	1

Figure 3.2: Leading Causes of Deaths: 2002 – 2006



For the most recent 5 year deaths, 2007 to 2011, showed the same leading causes of deaths with heart disease contributing to 30%, Respiratory at 21% and Cancer with 19%. Diabetes and External Causes both contributed to 11% of leading causes of deaths.

Table 3.3: Causes of Deaths: 2007 – 2011

CAUSES OF DEATH (2009)		
Heart Diseases(1-064)	17	30%
Respiratory Disease(1-072)	12	21%
Cancer(1-026)	11	19%
Diabetes(1-051)	6	11%
External causes(1-095)	6	11%
Infectious Diseases(1-001)	3	5%
Blood Disease(1-048)	1	2%
Genitourinary Disease(1-084)	1	2%
Digestive system(1-078)	0	0%
Skin Disease(1-082)	0	0%
Perinatal Conditions(1-092)	0	0%
Congenital Abnormalities(1-093)	0	0%
Total	57	1

Figure 3.3: Leading Causes of Deaths: 2007 – 2011

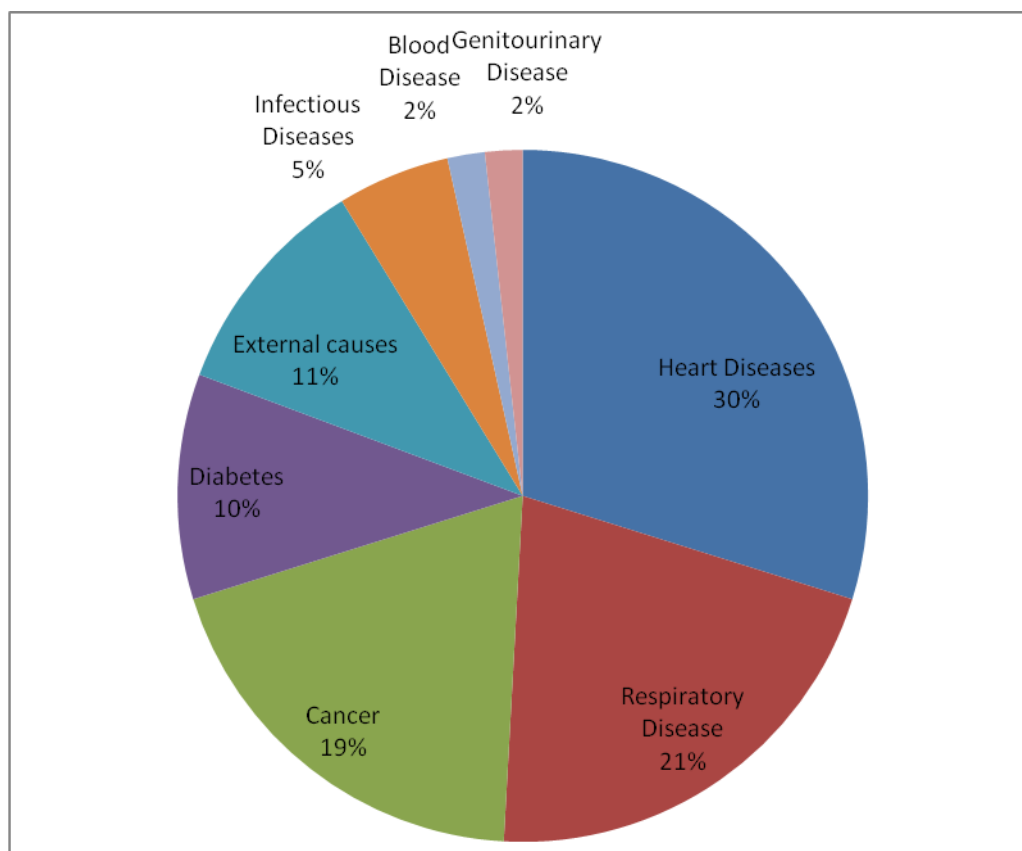
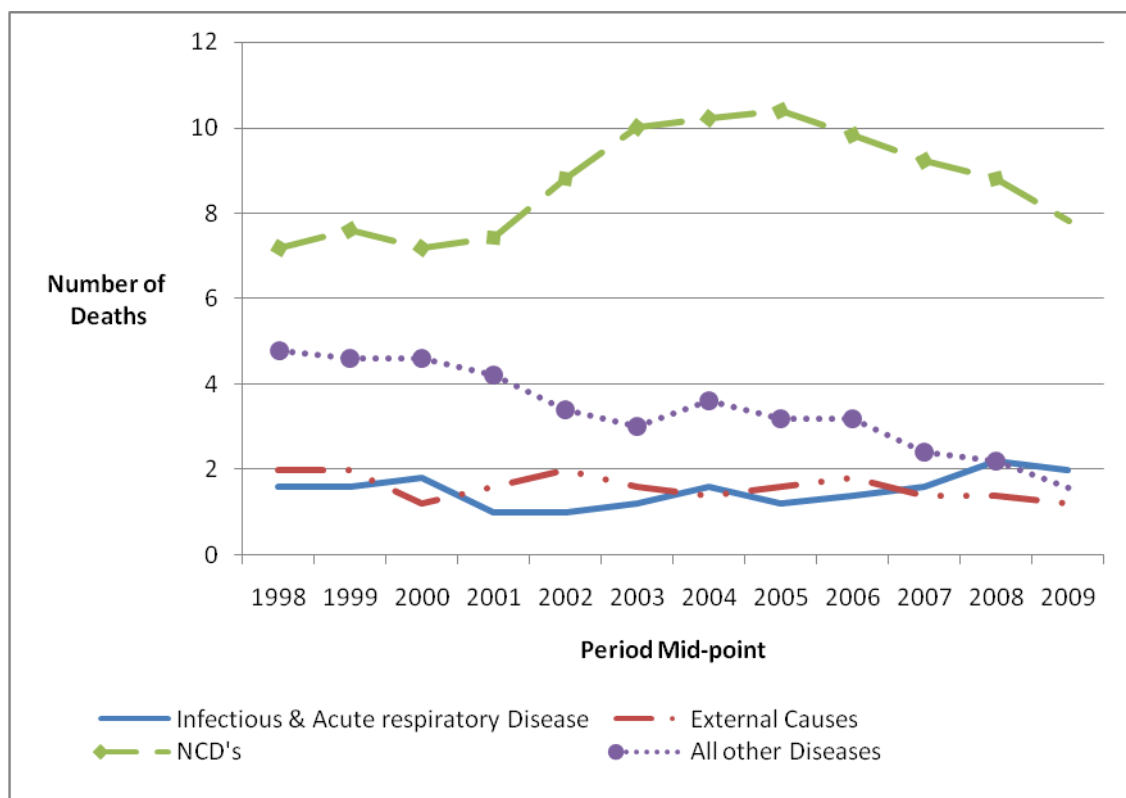


Figure 3.4 illustrates the causes of death in groups according to Infectious and Acute respiratory diseases, NCD's, External causes and All other diseases(including NA and ill-defined).

As is shown in figure 3.4 the leading cause of death is NCD's however there is a decrease as shown in the most recent years. This is most likely due to the awareness campaigns on NCD's. Deaths from "other diseases" show a declining trend due to the decrease in the number of records not available (NA) and ill-defined deaths throughout the years, reflecting improvements in medical certification of death.

Deaths due to infectious and acute respiratory disease, external causes both appear stable over the period reviewed.

*Figure 3.4: Rolling Average of Causes of Death 1996 – 2011.*





### 3.2 TOTAL NUMBER OF DEATHS BY CAUSES OF DEATHS AND RATES PER 100,000 IN AGE GROUPS

Cause of death by age group is reported for 1997-2011 combined due to the small number of deaths and level of disaggregation required.

#### ***Causes of Death for Under 5 years of age***

The leading cause of death in the under 5 age group was perinatal conditions, reflecting the fact that most under 5 mortality occurs as infant mortality and that the most vulnerable stage of a child's life is the first 28 days. Perinatal conditions as captured here are primarily linked to prematurity.

*Table 3.4: Causes of Death for Under 5 year olds by ICD chapter - Totals and rates per 100,000 population*

Under 5	TOTAL	RATES (95% CI)
Perinatal Conditions(1-092)	4	158.5 (43.2 – 405.8)
External causes(1-095)	2	79.2 (9.6 – 286.2)
Infectious Diseases(1-001)	1	39.6 (1.0 – 220.7)
Respiratory Disease(1-072)	1	39.6 (1.0 – 220.7)
Congenital Abnormalities(1-093)	1	39.6 (1.0 – 220.7)
NA/III-defined	1	39.6 (1.0 – 220.7)

#### ***Causes of Death for 5 – 14 Year Olds***

Only one death was recorded in 5-14 year olds over the study period and was due to external causes.

#### ***Adult Mortality 15 – 59 Year Olds***

Deaths by cause are shown in the following tables for males and females

*Table 3.5: Cause of Deaths for 15 – 59 year old males by ICD chapter - Totals and rates per 100,000 population*

15 - 59	TOTAL	RATES(95% CI)
External causes(1-095)	16	197.1 (112.7 – 320.1)
Heart Diseases(1-064)	5	61.6 (20.0 – 143.8)
Infectious Diseases(1-001)	4	49.3 (13.4 – 126.2)
Cancer(1-026)	4	49.3 (13.4 – 126.2)
Respiratory Disease(1-072)	2	24.6 (3.0 – 89.0)
Digestive system(1-078)	2	24.6 (3.0 – 89.0)
Diabetes(1-051)	1	12.3 (0.3 – 68.6)
NA/III-defined	5	61.6 (20.0 – 143.8)

*Table 3.6: Cause of Deaths for 15 – 59 year old females by ICD chapter – Totals and rates per 100,000 population*

15 - 59	TOTAL	RATES (95% CI)
External causes(1-095)	3	38.9 (8.0 – 113.6)
Cancer(1-026)	2	25.9 (3.1 – 93.6)
Respiratory Disease(1-072)	2	25.9 (3.1 – 93.6)
Heart Diseases(1-064)	1	13.0 (0.3 – 72.2)
NA/III-defined	3	38.9 (8.0 – 113.6)

For both males and females the leading cause of death from the years 1996 to 2011 was external causes. When examined more closely, these deaths for males were found to be Suicide (5 number of deaths), see appendix 1.3. Although the absolute numbers of deaths are small, at a population level, further attention by the Department of Health and government is warranted. The cause-specific mortality rate from suicide is estimated at 61.6 (95% CI: 20.0 – 143.8) per 100,000 people for males. The cause-specific mortality rate from motor vehicle accidents is estimated at 49.3 (with 95% confidence intervals at 13.4 – 126.2) per 100,000 people for males. For females no specific external cause of death was a major contributor with only 3 deaths recorded as external causes.

Following revision with other departments involved in Vital Processes (Civil registrar and Department of Health) an additional 2 causes of deaths were suspected to be suicide although not certified to suicide. One of these deaths was in the age groups of 60+.

This increases the suicide deaths rate from 61.6 (95% CI: 20.0 – 143.8) to 73.9 (95% CI: 27.1 – 23.6) per 100,000 people for males.

In the past 5 years there has been a total of 2 suicides, 3 vehicle accidents and 1 other external cause of death. Even though these are small numbers they are still events that can be minimized with community awareness and are a focus for concern.

Non communicable diseases (NCDs) also feature highly amongst the causes of death contributing to premature adult mortality, although not as highly as external causes for males even when all NCDs were combined. Infectious diseases reported as causes of death for males were Hepatitis and Septicaemia. The deaths attributed to septicaemia (which should have another underlying cause that gave rise to the septicaemia) and the high number of death either with no cause or with ill-defined causes in this age group indicate a need to continue to improve medical certification practices.

### **Adult Mortality from NCDs 30 – 69 years**

The probability of dying from 30-69 years of age (inclusive) from specific cause has also recently been introduced by WHO as a proposed indicator of mortality from NCDs. Non-Communicable Diseases are the leading cause of mortality in the world and are becoming increasingly important in the region. Accurate data on deaths and cause of death is the most effective way of measuring the disease burden in the population.

As shown in the tables below, for males 28 deaths were due to NCDs and for women 14 deaths were due to heart diseases, cancer, diabetes and non-acute respiratory diseases.

*Tables 3.7: NCD Premature (30 – 69 year olds) Mortality*

CODE	Diseases	Males	Females	Total
1-026	Cancer	10	4	14
1-064	Heart Diseases	9	5	14
1-095	External Causes	10	2	12
1-052	Diabetes	7	3	10
1-001	infectious Diseases	5	0	5
1-074	Pneumonia	4	0	4
1-076	Respiratory disease	2	2	4
1-075	Other Respiratory Infections	1	1	2
1-048	Blood Disease	0	1	1
1-078	Digestive System Disease	1	0	1
1-084	Genitourinary Disease	1	0	1
NA	Not Applicable/III-defined	6	3	9
TOTAL		55	22	77

The table below shows the probability in percentages of males and females dying of Non-communicable diseases between the ages of 30 – 69 inclusive.

This was calculated using the Life tables for the deaths caused only from non-communicable diseases such as cancer (1-026 – 1-047), diabetes (1-051 – 1-054), heart diseases (1-064 – 1-071) and respiratory diseases (1-076 – 1-077). This can be seen in appendix 1.6.

*Table 3.8: NCD Mortality Probability of dying: Age 30 – 69.*

5 year period	Total population
1997 - 2001	4.8
2002 - 2006	9.1
2007 - 2011	4.3

Between the years 1997 – 2011 the probability of dying from NCD's, aged 30 – 69, for the population was 4.8%. That is 5 out of every 30 – 69 year olds do not make it to 70 years of age. This equates to a 95.2% of surviving.

This increased to 9.1% of dying and then declined to 4.3% in the most recent 5 years 2007 – 2011. The public health awareness program on NCD's contributed to the healthy living lifestyle of Niueans beginning in 2009.

### ***Causes of Death for Older Adults (60+ Year Olds)***

As expected, the leading causes of death in adults aged over 60 years of age are non-communicable diseases. For males the leading causes of death when aggregated at ICD chapter level were Cancer followed by heart disease (as shown in table 3.9). When tabulated by more specific categories (103 cause list), the leading cause of death in males over 60 is ischaemic heart disease. For female, the leading group of diseases (at ICD chapter level) is heart disease, but when disaggregated to more specific categories, diabetes tops the list of individual causes with a total of 11 deaths. Ill-defined causes also feature prominently for both males and females, which is consistent with the increased difficulty to specify a specific casual sequence in patients who may have multiple co-morbidities.

*Table 3.9: Causes of Death for 60+ males by ICD chapter – Totals and rates per 100,000 people*

60 +	TOTAL	RATES (95% CI)
Cancer(1-026)	24	1324.3 (848.6 – 1970.8)
Heart Diseases(1-064)	23	1269.2 (804.6 – 1904.6)
Respiratory Disease(1-072)	20	1103.6 (674.2 – 1704.7)
Diabetes(1-051)	9	496.6 (227.1 – 942.9)
Infectious Diseases(1-001)	2	110.4 (13.4 – 398.7)
Genitourinary Disease(1-084)	2	110.4 (13.4 – 398.7)
External causes(1-095)	2	110.4 (13.4 – 398.7)
Skin Disease(1-082)	1	55.2 (1.4 – 307.5)
NA/III-defined	8	441.5 (190.6 – 869.9)

*Table 3.10: Causes of Death for 60+ females by ICD chapter – Totals and rates per 100,000 people*

60 +	TOTAL	RATES (95% CI)
Heart Diseases(1-064)	26	1160.1 (757.9 – 1700.0)
Cancer(1-026)	12	535.4 (276.7 – 935.4)
Diabetes(1-051)	12	535.4 (276.7 – 935.4)
Respiratory Disease(1-072)	8	356.9 (154.1 – 703.4)
Infectious Diseases(1-001)	2	89.2 (10.8 – 322.4)
Blood Disease(1-048)	2	89.2 (10.8 – 322.4)
Digestive system(1-078)	2	89.2 (10.8 – 322.4)
Skin Disease(1-082)	1	44.6 (1.1 – 248.6)
External causes(1-095)	1	44.6 (1.1 – 248.6)
NA/III-defined	20	892.4 (545.1 – 1378.3)

The leading causes of death for females in the age group of 60+ are mostly lifestyle diseases, NCDs. Heart Diseases are particularly high in this age group; however when the cause of death was uncategorised the main leading cause of death is Diabetes.

## CONCLUSION

Although the number of births is declining both birth and fertility rates are stable however with greater uncertainty in the figures. This uncertainty can also be seen in the infant mortality and under 5 mortality. Most deaths in the under 5 mortality category were due to perinatal causes.

Life expectancy for Niue is reasonably high in males (70.1) and females (76.3) however there is no significant improvement when compared to New Zealand's high life expectancy, males (78.8) and females (82.7). This is likely due to the impact of NCD's on premature adult mortality as seen also in the wider Pacific Island countries.

WHO recently introduced a new indicator of premature adult mortality which for Niue remains high for males (15.8%) in comparison to the females (7.8). This is consistent with the high external causes of deaths within the ages of 15 – 59.

The high proportion of deaths from external causes for both males and females in the age groups of 15 – 59 should be a priority for government. Especially for males as intentional self-harm contributed to most external causes of death with a rate of 61.6 (95% CI: 20.0 – 143.8).

### ***Other recommendations to improve vital statistics reporting***

In following this report it was noted that some statistical analysis can also be derived from collecting other information related to births in vital statistics.

These include premature births, baby birth weight, medically attended births and a possible new register for those adapted not to a Niuean resident. The office concerned endeavours to address these issues in future developments of the vital statistics system such as seek external assistance and attendance to training opportunities.

- **Premature births:**

Those born earlier than 37 weeks are at risk of health complications and require intensive care along with specialized staff and equipment that can deal with the multiple problems faced by premature births. There are also long lasting medical complications which may eventually lead to infant mortality.

- **Weight of Baby:**

Analysis of babies born under 2500 grams would be useful when reporting MDGs. This would provide an estimate of the small preterm births in a population. Low birth weight of infants can also result in high mortality rate and health complications similar to that of premature births.

- **Births medically attended:**

Even though most births in Niue have a medical professional attending a record of this should be kept and reported.

- **Register for Adopted Children:**

An idea to implement an adoption registry for those that are born overseas or to a different mother and then adopted and brought to live in Niue with adopted parents who are residents. It is suggested that these births be recorded separately from the birth register of residential mothers giving birth in Niue or overseas.

## REFERENCES

- Aetna Inc. (2009, July 1). *Teen's Health, Risks for Pregnant Teens*. Retrieved September 20, 2012, from AETNA, IntelliHealth-The trusted Source: <http://www.intelihealth.com/IH/ihIH/WSIHW000/31697/25753/310396.html?d=dmContent>
- C. J. L. Murraya, B. D. Fergusona, A. D. Lopez, M. Guillotc, J. A. Salomona & O. Ahmadd. (Volume 57, Issue 2, 2003). *Population Studies: A Journal of Demography. Modified logic life table system: Principles, empirical validation, and application*, 165 - 182.
- Chiang, C. L. (1967). Vital Health Statistics 2. In C. L. Chiang, *Variance and covariance of life table functions estimated from a sample of deaths* (pp. 20:1 - 8).
- Chiang, C. L. (n.d.). Introduction to stochastic processes in Biostatistics. In *The life table and its construction* (pp. Chapter 9, 189.214). New York: John Wiley & Sons 1968.
- Economics, Planning, Development and Statistics Office and Secretariat of the Pacific Community. (2008). *Niue Population Profile, Based on 2006 Census of Population and Housing - A guide for planners and policy makers*. Noumea: Secretariat of the Pacific Community.
- Google. (2012, September 6). *World Development Indicators and Global Public Data*. Retrieved August 23, 2012, from Google Public Data Explorer: <http://www.google.co.nz/publicdata/>
- (2004). In A. Haupt, & T. T. Kane, *Population Reference Bureau's Population Handbook, 5th Edition* (pp. 55 - 63). Washington DC, Washington DC, USA: Population Reference Bureau.
- March of Dimes Foundation. (2009, January). *Your Premature baby*. Retrieved September 19, 2012, from March of Dimes: [http://www.marchofdimes.com/baby/premature\\_indepth.html](http://www.marchofdimes.com/baby/premature_indepth.html)
- Statistics New Zealand. (2012, June). *New Zealand in Profile: 2012, International comparisons with our top 5 visitor source countries*. Retrieved September 19, 2012, from Statistics New Zealand: [http://www.stats.govt.nz/browse\\_for\\_stats/snapshots-of-nz/nz-in-profile-2012/international-comparisons-with-our-top-five-visitor-source-countries.aspx](http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-in-profile-2012/international-comparisons-with-our-top-five-visitor-source-countries.aspx)
- The World Bank Group. (2012). *Data, Indicators*. Retrieved September 20, 2012, from The World Bank, Working for a World Free of Poverty: <http://data.worldbank.org/indicator>
- WHO. (2012). *Classifications, International Classification of Diseases (ICD)*. Retrieved September 2012, from World Health Organisation: <http://www.who.int/classifications/icd/en/>
- Wikimedia Foundation, Inc. (2012, September 19). *Teenage Pregnancy*. Retrieved September 19, 2012, from Wikipedia, the free encyclopedia: [http://en.wikipedia.org/wiki/Teenage\\_pregnancy](http://en.wikipedia.org/wiki/Teenage_pregnancy)
- Williams, D. Eayres and E. S. (Vol. 58, No. 3 (Mar., 2004)). Evaluation of Methodologies for Small Area Life Expectancy Estimation. *Journal of Epidemiology and Community Health*(1979), 243 - 249.
- World Health Organisation. (2012). *Media Center, Women's Health*. Retrieved September 2012, from World Health Organization: <http://www.who.int/mediacentre/factsheets/fs334/en/>

# **APPENDICES**



## APPENDIX 1: STATISTICAL TABLES

### 1.1 BIRTHS

*5 Year period of Rolling Average of Number of Births: 1987 – 2011*

YR	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
F	20	19	18	16	15	15	14	14	14	14	14	14	14	14	14	14	14	13	13	12	11
M	23	23	22	21	18	18	16	15	14	13	12	10	9	10	11	11	12	13	13	13	12
TOT	46	44	43	40	36	34	32	30	28	27	26	25	24	24	25	27	28	26	28	27	24

*Total Number of Births by Age of Mothers in Age Groups: 1987 – 2011*

Years	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
< 15	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	3
15 - 19	7	4	12	3	4	3	3	3	0	2	2	3	5	2	2	2	4	2	3	3	2	0	0	4	0	75
20 -24	16	16	4	13	12	8	9	15	5	6	6	7	3	5	8	6	5	5	11	10	5	8	9	3	5	200
25 - 29	10	14	17	17	8	16	11	11	10	12	9	14	7	7	5	9	6	5	4	10	8	2	10	7	4	233
30 - 34	12	8	9	12	8	7	8	2	9	5	8	3	5	7	4	5	6	7	7	7	7	4	8	7	7	172
35 - 39	3	1	5	3	5	7	4	1	4	3	7	3	1	0	3	0	5	3	5	4	5	4	1	3	6	86
40 - 44	2	1	2	2	0	2	3	1	2	0	1	0	0	3	1	2	0	0	0	0	1	1	1	1	0	26
45 +	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2
Total	50	44	49	50	37	43	38	33	30	28	33	30	22	25	23	25	26	23	30	34	28	19	30	25	22	797

*Total Number of Births by Place of Birth: 2004 - 2011*

Birth Place	2004	2005	2006	2007	2008	2009	2010	2011	Total
Niue	5	2	15	16	6	2	11	14	71
Overseas	18	28	19	12	13	28	14	8	140
Not Stated	0	0	0	0	0	0	0	0	586
Total	23	30	34	28	19	30	25	22	797

Data on place of birth was poorly kept before 2004. After Cyclone Heta and the Lord Liverpool Hospital was destroyed in January 2004, mothers were then referred overseas for a much safer birth until the new hospital, Niue Fooou was constructed and medical professionals were available on the island to satisfy a safe delivery. Capturing these births was important to the Government of Niue as mothers were financially assisted with the travelling to New Zealand.

*Total Fertility Rate Calculations in 5 year age groups: 1987 – 2011 Expected births per woman over 5 years by age group*

Midpoint Year	1989	1994	1999	2004	2009
Less than 14	0.0	0.0	0.0	0.0	0.0
15 - 19	0.3	0.1	0.2	0.2	0.1
20 - 24	0.8	0.7	0.6	0.6	0.6
25 - 29	0.9	0.8	0.7	0.7	0.8
30 - 34	0.7	0.5	0.4	0.6	0.8
35 - 39	0.3	0.3	0.3	0.4	0.5
40 - 44	0.1	0.2	0.1	0.0	0.1
45 +	0.0	0.0	0.0	0.0	0.0
Total	3.1	2.7	2.3	2.6	2.8

## 1.2 DEATHS

*Total Number of Deaths by 5 Year Age groups: 1987 – 2011*

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0-4	0	0	1	1	1		1	0	1	0	1	0	1	1	2	0	1	1	0	1	0	1	0	0	1
5-14	0	0	2	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
15-24	0	0	0	2	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	1	0	2	0	0	0
25-34	1	0	0	0	0	0	0	0	0	0	3	2	0	1	0	1	2	1	0	1	0	2	0	0	0
35-44	1	0	0	2	1	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0
45-54	1	0	1	0	0	5	1	0	1	2	2	1	1	0	1	1	1	0	1	0	1	1	0	1	0
55-64	0	3	1	1	0	0	5	0	3	1	2	1	4	4	2	2	2	6	2	2	1	2	2	2	0
65-74	3	3	4	6	0	2	1	2	4	2	4	5	2	0	3	3	4	2	4	3	5	3	1	4	4
75+	8	7	11	5	10	5	4	4	11	6	4	11	6	6	6	6	7	10	7	10	3	5	9	8	4
Total	14	13	20	17	12	13	14	8	20	13	18	20	15	12	14	13	17	20	15	19	11	16	12	15	9

*Total Number of Deaths of Males in Age Groups: 1987 – 2011*

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0-4	0	0	0	0	1	0	0	0	1	0	0	0	1	1	1	0	0	1	0	0	0	1	0	0	0
5-14	0	0	2	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
15-24	0	0	0	2	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	1	0	2	0	0	0
25-34	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	2	0	0	1	0	1	0	0	0
35-44	1	0	0	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0
45-54	0	0	1	0	0	3	1	0	1	2	1	1	0	0	1	0	1	0	1	0	1	0	0	1	0
55-64	0	2	1	1	0	0	1	0	3	1	2	1	4	3	1	2	1	3	1	2	1	1	2	0	0
65-74	0	2	3	3	0	2	1	1	4	0	3	3	2	0	3	2	3	1	2	0	4	3	0	3	3
75+	3	2	4	2	5	2	2	4	8	4		2	3	1	3	3	4	3	4	6	2	4	4	3	2
Total	5	6	11	10	6	8	7	7	17	9	9	8	11	5	9	8	11	8	9	11	9	12	6	7	5

*Total Number of Deaths of Females in 5 Year Age groups: 1987 – 2011*

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0-4	0	0	1	1	0	0	1	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	0	0	1
5-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-34	0	0	0	0	0	0	0	0	0	0	2	1	0	1	0	0	0	1	0	0	0	1	0	0	0
35-44	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45-54	1	0	0	0	0	2	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0
55-64	0	1	0	0	0	0	4	0	0	0	0	0	0	1	1	0	1	3	1	0	0	1	0	2	0
65-74	3	1	1	3	0	0	0	1	0	2	1	2	0	0	0	1	1	1	2	3	1	0	1	1	1
75+	5	5	7	3	5	3	2	0	3	2	4	9	3	5	3	3	3	7	3	4	1	1	5	5	2
Total	9	7	9	7	6	5	7	1	3	4	9	12	4	7	5	5	6	12	6	8	2	4	6	8	4

*Total Number of Infant Deaths in Niue: 1987 – 2011*

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total	0	0	1	1	1	0	1	0	1	0	1	0	1	0	2	0	1	0	0	1	0	1	0	0	0

*Total Number of Under 5 Year Old Deaths in Niue: 1987 - 2011*

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0	0	0	1	1	1	0	1	0	1	0	1	0	1	0	2	0	1	0	0	1	0	1	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	1	1	0	1	0	1	0	1	0	1	1	2	0	1	1	0	1	0	1	0	0	1

*Age-specific Mortality Rate for males (death per 1,000 populations) in age groups: 1987 – 2011*

MALES	1989	1994	1999	2004	2009
0-4	1.4	1.6	6.7	3.2	3.4
5 - 14	1.4	2.4	0.9	0.0	0.0
15 - 24	1.8	3.2	1.4	1.6	2.9
25 - 34	1.3	0.0	3.0	6.5	2.5
35 - 44	5.7	1.7	1.7	4.1	2.0
45 - 54	1.8	13.8	6.3	3.4	3.7
55 - 64	10.8	11.4	23.8	28.1	12.6
65 - 74	34.7	34.2	41.9	24.1	42.4
75+	125.5	160.5	93.9	292.6	167.7
TOTAL	6.5	8.8	8.6	11.2	10.5

*Age-specific Mortality Rate for males (death per 1,000 populations) in age groups: 1987 – 2011*

FEMALES	1989	1994	1999	2004	2009
0-4	2.4	1.6	4.3	4.6	2.9
5 - 14	0.0	0.0	0.0	0.0	0.0
15 - 24	0.0	0.0	0.0	0.0	0.0
25 - 34	0.0	0.0	6.7	2.1	2.5
35 - 44	1.8	0.0	0.0	0.0	0.0
45 - 54	1.7	3.6	3.8	1.8	2.1
55 - 64	2.9	9.6	4.0	11.8	7.2
65 - 74	29.5	11.1	12.2	24.8	11.2
75+	114.6	52.5	107.9	142.6	95.4
TOTAL	6.6	3.7	7.7	8.7	6.2

### 1.3 LIFE TABLES FOR MALES AND FEMALES

MALES																									
							Probability of dying in	Life table survivors at		Life table years lived	life table years lived	Life Expectancy													
Age group (yrs)	x	Years in Interval	Linearity Adjustment	Population nNx	Deaths nDx	Mortality Rate nMx	interval x	beginning	deaths in	in interval x	from beginning	at beginning			sum(lx2[										
							nqx	of interval x	interval x	nLx	of interval x	of interval x		lx2[(1-ax)	(1-ax)n1+										
							n * nMx /	lx	ndx	n *	Tx	ex	n1+ex+1]	ex+1]2var			Lower	Upper							
x		n	a	nNx	nDx	nDx / nNx	[1+(1-a)*n*nMx]	lx-1 - ndx-1	nqx * lx	[lx+1 +(a * ndx)]	Tx+1 + nLx	Tx / lx	var(qx)	2var(qx)2	(qx)2	Var(ex)	SE	95% CI	95% CI						
1987 - 1991																									
0-4	0	5	0.3	735.86	1	0.001359	0.0068	100000	676.3	497633.1	7105449.1	71.054	4.5E-05	2.228E+09	2.77E+10	2.7675	1.6636	67.794	74.315	Adult Mortality	15 - 59				
5-14	5	10	0.5	1438.21	2	0.001391	0.0138	99324	1371.7	986379.0	6607816.024	66.528	9.4E-05	3.611E+09	2.54E+10	2.5795	1.6061			Star pop.	97952.1				
15-24	15	10	0.5	1095.96	2	0.001825	0.0181	97952	1771.4	970663.9	5621437.018	57.390	0.00016	4.385E+09	2.18E+10	2.2759	1.5086			Deaths 15 - 59)	14421				
25-34	25	10	0.5	751.57	1	0.001331	0.0132	96181	1271.3	955450.7	4650773.134	48.355	0.00017	3.078E+09	1.75E+10	1.8864	1.3735			AMR	0.1472				
35-44	35	10	0.5	526.95	3	0.005693	0.0554	94909	5253.8	922825.5	3695322.389	38.935	0.00096	1.122E+10	1.44E+10	1.5955	1.2631			Percentage	14.72				
45-54	45	10	0.5	556.36	1	0.001797	0.0178	89656	1597.1	888571.1	2772496.851	30.924	0.00031	836545262	3.16E+09	0.3926	0.6266								
55-64	55	10	0.5	368.98	4	0.010841	0.1028	88059	9055.3	835308.9	1883925.712	21.394	0.00237	459793663	2.32E+09	0.2991	0.5469								
65-74	65	10	0.5	230.60	8	0.034691	0.2956	79003	23356.0	673252.0	1048616.853	13.273	0.0077	1.201E+09	1.86E+09	0.2979	0.5458								
75+	75	10	0.5	127.54	16	0.125451	1	55647	55647.2	375364.9	375364.884	6.745	0.00851	658716690	6.59E+08	0.0000	0.0000								
1992 - 1996																									
0-4	0	5	0.3	620.45	1	0.001612	0.0080	100000	801.3	497195.3	6877701.812	68.777	6.4E-05	2.93E+09	2.76E+10	2.7601	1.6613	65.521	72.033	Adult Mortality	15 - 59				
5-14	5	10	0.5	1263.40	3	0.002375	0.0235	99199	2327.9	980347.1	6380506.531	64.320	0.00018	6.509E+09	2.47E+10	2.5071	1.5834			Star pop.	96870.8				
15-24	15	10	0.5	946.88	3	0.003168	0.0312	96871	3021.3	953601.2	5400159.447	55.746	0.00031	8.088E+09	1.82E+10	1.9354	1.3912			Deaths 15 - 59)	20809				
25-34	25	10	0.5	717.69	0	0	0	93849	0.0	93849.8	4446558.242	47.380	0	0	1.01E+10	1.1437	1.0695			AMR	0.2148				
35-44	35	10	0.5	595.63	1	0.001679	0.0166	93849	1562.5	930682.2	3508063.482	37.380	0.00027	2.603E+09	1.01E+10	1.1437	1.0695			Percentage	21.48				
45-54	45	10	0.5	508.34	7	0.01377	0.1288	92287	11889.6	863421.4	2577381.286	27.928	0.00207	5.886E+09	7.47E+09	0.8772	0.9366								
55-64	55	10	0.5	438.63	5	0.011399	0.1078	80397	8670.3	760621.5	1713959.848	21.319	0.00208	335338780	1.58E+09	0.2451	0.4951								
65-74	65	10	0.5	234.25	8	0.034152	0.2917	71727	20923.2	612653.7	953338.3358	13.291	0.00753	968992760	1.25E+09	0.2428	0.4928								
75+	75	10	0.5	124.60	20	0.160509	1	50804	50803.8	340684.7	340684.6768	6.706	0.00434	280227045	2.8E+08	0.0000	0.0000								
1997 - 2001																									
0-4	0	5	0.3	445.80	3	0.006729	0.0329	100000	3287.3	488494.4	6719220.085	67.192	0.00035	1.607E+10	3.7E+10	3.6963	1.9226	63.424	70.960	Adult Mortality	15 - 59				
5-14	5	10	0.5	1095.43	1	0.000913	0.0091	96713	878.9	962732.5	6230725.698	64.425	8.2E-05	2.753E+09	2.09E+10	2.2334	1.4945			Star pop.	95833.8				
15-24	15	10	0.5	735.37	1	0.00136	0.0135	95834	1294.4	951866.2	5267993.198	54.970	0.00018	4.241E+09	1.81E+10	1.9748	1.4053			Deaths 15 - 59)	20066				
25-34	25	10	0.5	671.45	2	0.002979	0.0293	94539	2774.7	931520.9	4316127.024	45.654	0.00042	6.554E+09	1.39E+10	1.5548	1.2469			AMR	0.2094				
35-44	35	10	0.5	605.95	1	0.00165	0.0164	91765	1502.0	910137.6	3384606.158	36.884	0.00026	2.331E+09	7.34E+09	0.8718	0.9337			Percentage	20.94				
45-54	45	10	0.5	478.81	3	0.006265	0.0608	90263	5483.6	875209.5	2474468.556	27.414	0.00116	2.918E+09	5.01E+09	0.6149	0.7842								
55-64	55	10	0.5	462.45	11	0.023786	0.2126	84779	18022.3	757679.9	1599259.007	18.864	0.00323	581266299	2.09E+09	0.2910	0.5395								
65-74	65	10	0.5	262.47	11	0.04191	0.3465	66757	23130.9	551913.9	841579.1246	12.607	0.00713	794658907	1.51E+09	0.3389	0.5822								
75+	75	10	0.5	119.77	9	0.075144	1	43626	43626.0	289665.2	289665.2034	6.640	0.01504	715758287	7.16E+08	0.0000	0.0000								

2002 - 2006																					
0-4	0	5	0.3	312.71	1	0.003198	0.0158	100000	1581.229	494465.7	6779843.88	67.798	0.00025	1.117E+10	4.17E+10	4.1665	2.0412	63.798	71.799	Adult Mortality	15 - 59
5-14	5	10	0.5	840.30	0	0	0	98419	0	984187.7	6285378.182	63.864	0	0	3.05E+10	3.1487	1.7744			Star pop.	98418.8
15-24	15	10	0.5	626.39	1	0.001596	0.0158	98419	1558.765	976393.9	5301190.474	53.864	0.00025	5.895E+09	3.05E+10	3.1487	1.7744			Deaths 15 - 59)	24538
25-34	25	10	0.5	618.03	4	0.006472	0.0627	96860	6072.46	938237.8	4324796.593	44.650	0.00092	1.546E+10	2.46E+10	2.6225	1.6194			AMR	0.2493
35-44	35	10	0.5	493.13	2	0.004056	0.0398	90788	3608.908	889830.9	3386558.835	37.302	0.00076	7.076E+09	9.14E+09	1.1091	1.0531			Percentage	24.93
45-54	45	10	0.5	583.77	2	0.003426	0.0337	87179	2936.452	857104.1	2496727.917	28.639	0.00055	1.533E+09	2.07E+09	0.2718	0.5213				
55-64	55	10	0.5	320.85	9	0.02805	0.2460	84242	20723.7	738803.4	1639623.8	19.463	0.00507	899503030	5.33E+08	0.0750	0.2739				
65-74	65	10	0.5	331.99	8	0.024097	0.2151	63518	13660.29	566883.4	900820.4471	14.182	0.00454	457726761	-3.67E+08	-0.0909	#NUM!				
75+	75	10	0.5	68.35	20	0.292632	1	49858	49858.19	333937.1	333937.0508	6.698	-0.0133	-8.25E+08	-8.25E+08	0.0000	0.0000				
2007 - 2011																					
0-4	0	5	0.3	290.98	1	0.003437	0.0170	100000	1697.912	494057.3	7012532.336	70.125	0.00028	1.381E+10	4.25E+10	4.2473	2.0609	66.086	74.165	Adult Mortality	15 - 59
5-14	5	10	0.5	591.24	0	0	0	98302	0	983020.9	6518475.028	66.311	0	0	2.87E+10	2.9660	1.7222			Star pop.	98302.1
15-24	15	10	0.5	693.77	2	0.002883	0.0284	98302	2793.581	969053.0	5535454.149	56.311	0.00039	1.057E+10	2.87E+10	2.9660	1.7222			Deaths 15 - 59)	15546
25-34	25	10	0.5	399.24	1	0.002505	0.0247	95509	2362.675	943271.7	4566401.176	47.811	0.0006	1.049E+10	1.81E+10	1.9829	1.4081			AMR	0.1581
35-44	35	10	0.5	490.18	1	0.00204	0.0202	93146	1881.044	922053.1	3623129.483	38.897	0.0004	4.149E+09	7.6E+09	0.8756	0.9357			Percentage	15.81
45-54	45	10	0.5	544.93	2	0.00367	0.0360	91265	3289.207	896201.8	2701076.387	29.596	0.00063	1.616E+09	3.45E+09	0.4139	0.6433				
55-64	55	10	0.5	317.09	4	0.012615	0.1187	87976	10439.5	827558.3	1804874.548	20.516	0.0031	600317871	1.83E+09	0.2366	0.4864				
65-74	65	10	0.5	306.26	13	0.042447	0.3502	77536	27149.81	639611.7	977316.256	12.605	0.00613	921167404	1.23E+09	0.2047	0.4525				
75+	75	10	0.5	89.47	15	0.167653	1	50386	50386.27	337704.5	337704.5141	6.702	0.00488	309656153	3.1E+08	0.0000	0.0000				

FEMALES																						
Age group (yrs)	x	Years in Interval n	Linearity Adjustment a	Population nNx	Deaths nDx	Rate nMx	Mortality n * nMx / [1 + (1 - a) * n * nMx]	Life table survivors at beginning of interval x lx-1 - ndx-1	Life table deaths in interval x ndx	Life table years lived in interval x nLx	Life table years lived from beginning at beginning of interval x Tx	Life Expectancy of interval x ex	var(qx)	2var(qx)2	sum(lx2[(1-ax)n1+ex+1])	1Var(ex)	SE	Lower 95% CI	Upper 95% CI			
1987 - 1991																						
0-4	0	5	0.3	822.98	2	0.0024	0.0120	100000	1204.8	495783.1	7618335.637	76.183	7.2E-05	4.098E+09	1.18E+10	1.1759	1.0844	74.058	78.309	Adult Mortality	15 - 59	
5-14	5	10	0.5	1341.77	0	0	0	98795	0	987951.6	7122552.584	72.094	0	0	7.66E+09	0.7850	0.8860			Star pop.	98795	
15-24	15	10	0.5	875.94	0	0	0	98795	0	987951.6	6134601.006	62.094	0	0	7.66E+09	0.7850	0.8860			Deaths 15 - 59)	4783	
25-34	25	10	0.5	717.67	0	0	0	98795	0.0	987951.6	5146649.427	52.094	0	0	7.66E+09	0.7850	0.8860			AMR	0.0484	
35-44	35	10	0.5	540.68	1	0.0018	0.0183	98795	1810.5	978899.0	4158697.848	42.094	0.00033	4.595E+09	7.66E+09	0.7850	0.8860			Percentage	4.84	
45-54	45	10	0.5	603.23	1	0.0017	0.0164	96985	1594.6	961873.7	3179798.809	32.787	0.00027	883313526	3.07E+09	0.3261	0.5710					
55-64	55	10	0.5	341.19	1	0.0029	0.0289	95390	2755.4	940124.0	2217925.069	23.251	0.00081	184322272	2.18E+09	0.2400	0.4899					
65-74	65	10	0.5	271.14	8	0.0295	0.2571	92635	23818.3	807255.6	1277801.056	13.794	0.00614	1.317E+09	2E+09	0.2330	0.4827					
75+	75	10	0.5	218.17	25	0.1146	1	68816	68816.4	470545.5	470545.4567	6.838	0.00576	682362554	6.82E+08	0.0000	0.0000					
1992 - 1996																						
0-4	0	5	0.3	615.99	1	0.0016	0.0081	100000	807.1	497175.1	7710681.1	77.107	6.5E-05	3.754E+09	8.92E+09	0.8915	0.9442	75.256	78.957	Adult Mortality	15 - 59	
5-14	5	10	0.5	1321.62	0	0	0	99193	0	991928.9	7213505.997	72.722	0	0	5.16E+09	0.5245	0.7243			Star pop.	99192.9	
15-24	15	10	0.5	752.31	0	0	0	99193	0	991928.9	6221577.134	62.722	0	0	5.16E+09	0.5245	0.7243			Deaths 15 - 59)	7917	
25-34	25	10	0.5	665.25	0	0	0	99193	0	991928.9	5229648.27	52.722	0	0	5.16E+09	0.5245	0.7243			AMR	0.0798	
35-44	35	10	0.5	579.84	0	0	0	99193	0	991928.9	4237719.406	42.722	0	0	5.16E+09	0.5245	0.7243			Percentage	7.98	
45-54	45	10	0.5	550.28	2	0.0036	0.0357	99193	3540.8	974224.6	3245790.542	32.722	0.00061	2.574E+09	5.16E+09	0.5245	0.7243					
55-64	55	10	0.5	417.20	4	0.0096	0.0915	95652	8751.4	912763.2	2271565.919	23.748	0.0019	434877184	2.59E+09	0.2827	0.5317					
65-74	65	10	0.5	269.39	3	0.0111	0.1055	86901	9167.0	823171.0	1358802.685	15.636	0.00332	626413814	2.15E+09	0.2850	0.5338					
75+	75	10	0.5	190.53	10	0.0525	1	77734	77733.6	535631.7	535631.717	6.891	0.0101	1.526E+09	1.53E+09	0.0000	0.0000					
1997 - 2001																						
0-4	0	5	0.3	469.12	2	0.0043	0.0210	100000	2100.3	492648.9	7389326.051	73.893	0.00022	1.181E+10	3.81E+10	3.8105	1.9521	70.067	77.719	Adult Mortality	15 - 59	
5-14	5	10	0.5	1025.03	0	0	0	97900	0	978996.8	6896677.177	70.446	0	0	2.63E+10	2.7438	1.6564			Star pop.	97899.7	
15-24	15	10	0.5	701.61	0	0	0	97900	0	978996.8	5917680.395	60.446	0	0	2.63E+10	2.7438	1.6564			Deaths 15 - 59)	11494	
25-34	25	10	0.5	596.75	4	0.0067	0.0649	97900	6349.4	947249.8	4938683.613	50.446	0.00098	2.226E+10	2.63E+10	2.7438	1.6564			AMR	0.1174	
35-44	35	10	0.5	526.39	0	0	0	91550	0	915502.7	3991433.849	43.598	0	0	4.04E+09	0.4817	0.6941			Percentage	11.74	
45-54	45	10	0.5	529.22	2	0.0038	0.0371	91550	3395.7	898524.4	3075931.102	33.598	0.00066	2.336E+09	4.04E+09	0.4817	0.6941					
55-64	55	10	0.5	494.08	2	0.0040	0.0397	88155	3497.6	864057.8	2177406.722	24.700	0.00076	146851150	1.7E+09	0.2189	0.4679					
65-74	65	10	0.5	246.75	3	0.0122	0.1146	84657	9702.9	798055.1	1313348.896	15.514	0.00388	694632155	1.55E+09	0.2169	0.4657					
75+	75	10	0.5	222.39	24	0.1079	1	74954	74954.1	515293.8	515293.7905	6.875	0.00612	859872960	8.6E+08	0.0000	0.0000					



2002 - 2006																							
0-4	0	5	0.3	438.36	2	0.0046	0.0225	100000	2245.4	492141.2	7397834.985	73.978	0.00025	1.355E+10	2.49E+10	2.4923	1.5787	70.884	77.073	Adult Mortality	15 - 59		
5-14	5	10	0.5	685.27	0	0	0	97755	0	977546.4	6905693.76	70.643	0	0	1.14E+10	1.1906	1.0911			Star pop.	97754.6		
15-24	15	10	0.5	731.64	0	0	0	97755	0	977546.4	5928147.401	60.643	0	0	1.14E+10	1.1906	1.0911			Deaths 15 - 59)	8922		
25-34	25	10	0.5	486.64	1	0.0021	0.0203	97755	1988.3	967604.7	4950601.042	50.643	0.00041	8.407E+09	1.14E+10	1.1906	1.0911			AMR	0.0913		
35-44	35	10	0.5	466.78	0	0	0	95766	0	957663.0	3982996.382	41.591	0	0	2.97E+09	0.3238	0.5690			Percentage	9.13		
45-54	45	10	0.5	561.05	1	0.0018	0.0177	95766	1691.8	949203.8	3025333.423	31.591	0.00031	1.038E+09	2.97E+09	0.3238	0.5690						
55-64	55	10	0.5	423.71	5	0.0118	0.1114	94074	10482.8	888330.5	2076129.628	22.069	0.00221	488222686	1.93E+09	0.2183	0.4672						
65-74	65	10	0.5	322.89	8	0.0248	0.2205	83592	18428.2	743775.3	1187799.135	14.210	0.00474	827289352	1.44E+09	0.2066	0.4546						
75+	75	10	0.5	140.29	20	0.1426	1	65163	65163.4	444023.8	444023.832	6.814	0.00581	616557459	6.17E+08	0.0000	0.0000						
2007 - 2011																							
0-4	0	5	0.3	342.24	1	0.0029	0.0145	100000	1446.2	494938.3	7629808.345	76.298	0.00021	1.187E+10	2.94E+10	2.9367	1.7137	72.939	79.657	Adult Mortality	15 - 59		
5-14	5	10	0.5	685.77	0	0	0	98554	0	985538.1	7134870	72.396	0	0	1.75E+10	1.8011	1.3421			Starting pop.	98553.8		
15-24	15	10	0.5	569.93	0	0	0	98554	0	985538.1	6149331.871	62.396	0	0	1.75E+10	1.8011	1.3421			Deaths 15 - 59)	7692		
25-34	25	10	0.5	403.88	1	0.0025	0.0245	98554	2410.3	973486.5	5163793.742	52.396	0.00058	1.338E+10	1.75E+10	1.8011	1.3421			AMR	0.0780		
35-44	35	10	0.5	457.84	0	0	0	96143	0	961434.9	4190307.244	43.584	0	0	4.12E+09	0.4453	0.6673			Percentage	7.80		
45-54	45	10	0.5	473.32	1	0.0021	0.0209	96143	2010.0	951384.8	3228872.377	33.584	0.00043	1.683E+09	4.12E+09	0.4453	0.6673						
55-64	55	10	0.5	416.65	3	0.0072	0.0695	94133	6542.3	908623.1	2277487.532	24.194	0.0015	331896112	2.43E+09	0.2746	0.5240						
65-74	65	10	0.5	355.87	4	0.0112	0.1064	87591	9321.4	829304.5	1368864.453	15.628	0.00253	485258817	2.1E+09	0.2739	0.5233						
75+	75	10	0.5	146.82	14	0.0954	1	78270	78269.8	539560.0	539559.9699	6.894	0.01055	1.616E+09	1.62E+09	0.0000	0.0000						

## 1.4 POPULATION ESTIMATES

### *Population Estimates in age groups: 1987 – 2011*

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0-4	348	328	308	297	278	270	258	247	236	225	210	198	184	169	155	154	152	150	147	147	143	137	129	119	105
5-14	586	565	544	541	544	535	533	519	506	492	472	454	429	391	374	348	322	298	276	281	269	259	252	248	249
15-24	426	407	388	381	370	359	349	340	330	321	311	297	286	274	269	267	271	278	286	256	254	253	254	253	250
25-34	311	300	288	286	284	281	278	276	275	273	271	260	247	270	220	228	230	228	223	196	185	172	159	148	140
35-44	210	209	208	214	226	228	231	235	239	242	247	240	233	192	221	207	194	182	172	206	201	195	190	184	179
45-54	242	235	227	228	228	223	217	212	206	201	194	191	194	222	207	217	227	236	243	222	217	210	203	197	191
55-64	141	140	139	142	148	151	161	171	181	192	210	203	194	175	175	165	155	145	138	141	140	142	146	151	155
65-74	100	99	98	100	105	104	102	101	99	98	95	95	96	111	112	121	129	134	138	132	137	138	135	129	123
75+	82	75	69	64	56	56	59	63	67	70	78	76	73	61	55	47	42	39	36	45	42	43	46	50	55
Total	2445	2357	2269	2255	2239	2207	2189	2164	2139	2114	2088	2012	1937	1864	1788	1754	1722	1690	1660	1626	1587	1550	1514	1479	1446

### *Population Estimates in age groups for males: 1987 – 2011*

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0-4	156	150	144	143	142	135	130	124	118	113	107	98	90	79	72	67	64	61	60	61	61	61	60	57	53
5-14	315	298	282	275	268	262	257	253	248	244	239	229	219	209	199	192	181	168	153	146	135	125	116	110	106
15-24	231	223	215	214	213	204	197	189	182	174	167	158	149	132	130	122	121	124	129	131	133	136	140	142	142
25-34	158	153	147	147	146	145	144	144	143	143	142	136	130	147	117	125	130	131	129	104	96	87	78	71	66
35-44	107	105	103	105	107	111	115	119	123	128	132	129	126	101	119	110	101	93	86	104	101	100	98	97	94
45-54	114	112	109	110	111	107	105	102	99	96	93	94	94	103	95	104	113	121	127	118	117	113	109	105	101
55-64	74	73	72	74	76	80	84	88	92	96	100	97	94	85	87	77	68	60	54	61	60	60	62	66	69
65-74	46	46	45	46	47	47	47	47	47	47	47	49	51	58	58	63	67	70	73	60	64	64	63	60	56
75+	28	26	25	25	24	24	25	25	25	26	26	26	25	23	20	17	14	11	9	18	16	16	17	19	22
Total	1229	1186	1144	1139	1134	1115	1102	1090	1078	1065	1053	1014	975	939	897	877	857	838	820	803	782	763	744	726	708

*Population Estimates in age groups for males: 1987 – 2011*

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0-4	192	178	163	154	136	134	128	123	118	112	103	99	94	89	83	87	89	89	87	86	81	76	70	62	53
5-14	271	267	262	266	276	273	276	267	258	248	233	225	210	182	175	156	141	130	123	135	134	134	136	139	143
15-24	195	184	173	167	157	155	152	150	148	146	144	139	137	142	139	145	150	155	157	125	121	117	114	111	108
25-34	153	147	141	140	138	136	134	133	132	130	129	124	118	122	103	103	101	97	94	92	88	85	81	77	74
35-44	103	104	105	109	119	118	116	116	115	115	115	111	108	91	102	97	93	89	86	102	99	96	91	87	84
45-54	127	123	118	118	117	116	112	110	107	105	101	97	100	119	112	113	114	115	116	104	100	97	94	92	90
55-64	68	67	66	68	72	71	77	83	90	96	110	106	101	89	88	88	87	85	84	80	80	82	84	85	86
65-74	53	53	53	54	58	57	55	54	52	51	48	46	46	53	54	59	62	64	66	72	74	73	72	70	67
75+	54	49	44	40	32	32	35	38	41	45	52	50	48	37	35	30	28	27	27	27	26	27	29	31	33
Total	1216	1171	1125	1116	1105	1093	1087	1074	1061	1048	1035	998	962	926	891	877	864	852	840	823	805	787	770	753	738

## 1.5 CAUSE OF DEATHS (by ICD General Mortality list – 103 causes)

*Cause of Death with rates and 95% confidence intervals for Males & Females 15 - 59 Yr Olds: 1996 – 2011*

15 - 59	MALES	Total	RATES	Upper CI	Lower CI
1-101	Intentional self-harm	5	61.6	143.8	20.0
1-096	Transport Accidents	4	49.3	126.2	13.4
1-098	Accidental drowning and submersion	4	49.3	126.2	13.4
1-068	Other heart disease	3	37.0	108.0	7.6
1-103	All other external causes	3	37.0	108.0	7.6
1-012	Septicaemia	2	24.6	89.0	3.0
1-019	Viral Hepatitis	2	24.6	89.0	3.0
1-034	Malignant neoplasm of trachea, bronchus and lung	2	24.6	89.0	3.0
1-027	Malignant neoplasm of lip, oral cavity and pharynx	1	12.3	68.6	0.3
1-029	Malignant neoplasm of stomach	1	12.3	68.6	0.3
1-052	Diabetes mellitus	1	12.3	68.6	0.3
1-066	Hypertensive diseases	1	12.3	68.6	0.3
1-071	Remainder of diseases of the circulatory system	1	12.3	68.6	0.3
1-075	Other acute lower respiratory infections	1	12.3	68.6	0.3
1-076	Chronic lower respiratory disease	1	12.3	68.6	0.3
1-080	Diseases of the liver	1	12.3	68.6	0.3
1-081	Remainder of diseases of the digestive system	1	12.3	68.6	0.3
1-094	Ill-defined	2	24.6	89.0	3.0
NA	Not Available	3	37.0	108.0	7.6

15 - 59	FEMALES	Total	RATES	Upper CI	Lower CI
1-103	All other external causes	3	38.9	113.551	8.01
1-034	Malignant neoplasm of trachea, bronchus and lung	1	13.0	72.16	0.33
1-038	Malignant neoplasm of other and unspecified parts of uterus	1	13.0	72.16	0.33
1-067	Ischaemic heart disease	1	13.0	72.16	0.33
1-074	Pneumonia	1	13.0	72.16	0.33
1-075	Other acute lower respiratory infections	1	13.0	72.16	0.33
NA	Not Available	3	38.9	113.551	8.01

*Cause of Death with rates and 95% confidence intervals for Males & Females Age 60+: 1996 – 2011*

60 +	MALES	Total	RATES	Upper CI	Lower CI
1-067	Ischaemic heart diseases	11	607.0	1086.2	303.0
1-052	Diabetes mellitus	9	496.6	942.9	227.1
1-074	Pneumonia	9	496.6	942.9	227.1
1-076	Chronic lower respiratory diseases	9	496.6	942.9	227.1
1-040	Malignant neoplasm of prostate	6	331.1	720.7	121.5
1-068	Other heart diseases	6	331.1	720.7	121.5
1-030	Malignant neoplasms of colon, rectum and anus	4	220.7	565.2	60.1
1-034	Malignant neoplasm of trachea, bronchus and lung	4	220.7	565.2	60.1
1-029	Malignant neoplasm of stomach	3	165.5	483.8	34.1
1-069	Cerebrovascular diseases	3	165.5	483.8	34.1
1-031	Malignant neoplasms of liver and intrahepatic bile ducts	2	110.4	398.7	13.4
1-046	Remainder of malignant neoplasms	2	110.4	398.7	13.4

1-070	Atherosclerosis	2	110.4	398.7	13.4
1-086	Remainder of diseases of the genitourinary system	2	110.4	398.7	13.4
1-005	Respiratory tuberculosis	1	55.2	307.5	1.4
1-019	Viral hepatitis	1	55.2	307.5	1.4
1-027	Malignant neoplasm of lip, oral cavity and pharynx	1	55.2	307.5	1.4
1-032	Malignant neoplasms of pancreas	1	55.2	307.5	1.4
1-045	Leukaemia	1	55.2	307.5	1.4
1-066	Hypertensive diseases	1	55.2	307.5	1.4
1-075	Other acute lower respiratory infections	1	55.2	307.5	1.4
1-077	Remainder of diseases of the respiratory system	1	55.2	307.5	1.4
1-082	Diseases of the skin and subcutaneous tissue	1	55.2	307.5	1.4
1-098	Accidental drowning and submersion	1	55.2	307.5	1.4
1-103	All other external causes	1	55.2	307.5	1.4
1-094	Ill-defined	3	165.5	483.8	34.1
NA	Not Available	5	275.9	643.9	89.6

60 +	FEMALES	Total	RATES	Upper CI	Lower CI
1-052	Diabetes mellitus	11	490.8	878.3	245.0
1-068	Other heart diseases	9	401.6	762.4	183.6
1-069	Cerebrovascular diseases	9	401.6	762.4	183.6
1-067	Ischaemic heart diseases	4	178.5	457.0	48.6
1-074	Pneumonia	4	178.5	457.0	48.6
1-034	Malignant neoplasm of trachea, bronchus and lung	3	133.9	391.2	27.6
1-066	Hypertensive diseases	3	133.9	391.2	27.6
1-076	Chronic lower respiratory diseases	3	133.9	391.2	27.6
1-029	Malignant neoplasm of stomach	2	89.2	322.4	10.8
1-037	Malignant neoplasms of cervix uteri	2	89.2	322.4	10.8
1-050	Remainder of diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	2	89.2	322.4	10.8
1-005	Respiratory tuberculosis	1	44.6	248.6	1.1
1-012	Septicaemia	1	44.6	248.6	1.1
1-036	Malignant neoplasms of breast	1	44.6	248.6	1.1
1-044	Multiple myeloma and malignant plasma cell neoplasms	1	44.6	248.6	1.1
1-045	Leukaemia	1	44.6	248.6	1.1
1-046	Remainder of malignant neoplasms	1	44.6	248.6	1.1
1-047	Remainder of neoplasms	1	44.6	248.6	1.1
1-053	Malnutrition	1	44.6	248.6	1.1
1-071	Remainder of diseases of the circulatory system	1	44.6	248.6	1.1
1-077	Remainder of diseases of the respiratory system	1	44.6	248.6	1.1
1-080	Diseases of the liver	1	44.6	248.6	1.1
1-081	Remainder of diseases of the digestive system	1	44.6	248.6	1.1
1-082	Skin diseases	1	44.6	248.6	1.1
1-103	All other external causes	1	44.6	248.6	1.1
1-094	Ill-defined	10	446.2	820.6	214.0
NA	Not Available	10	446.2	820.6	214.0

### 1.6 LIFE TABLES FOR CALCULATING NCD PROBABILITY

							Probability of dying in interval x	Life table survivors at beginning of interval x	Life table deaths in Interval x	Life table years lived in interval x	life table years lived from beginning of interval x	Life Expectancy at beginning of interval x		
Age group (yrs)	x	Years in Interval	Linearity Adjustment	Population	Deaths	Mortality Rate nMx	n * nMx / [1 + (1 - a) * n * nMx]	lx	ndx	nLx	Tx	ex		
x		n	a	nNx	nDx	nDx / nNx		lx-1 - ndx-1	nqx * lx	[lx+1 + (a * ndx)]	Tx+1 + nLx	Tx / lx		
<b>1997 - 2001</b>													<b>NCD Probability</b>	
0-4	0	5	0.3	914.9165444	0	0	0	100000	0	500000	7751815.51	77.52	Star pop.	100000
5-14	5	10	0.5	2120.462662	0	0	0	100000	0	1000000	7251815.51	72.52	Deaths	4839.6841
15-24	15	10	0.5	1436.983295	0	0	0	100000	0	1000000	6251815.51	62.52	AMR	0.0483968
25-34	25	10	0.5	1268.197382	1	0.0007885	0.0079	100000	785.42	996073	5251815.51	52.52	Percentage	4.8396841
35-44	35	10	0.5	1132.342545	0	0	0	99214.6	0	992146	4255742.63	42.89		
45-54	45	10	0.5	1008.030357	1	0.000992	0.0099	99214.6	979.38	987249	3263596.87	32.89		
55-64	55	10	0.5	956.5340937	7	0.0073181	0.0706	98235.2	6935.18	947676	2276348.03	23.17		
65-74	65	10	0.5	509.2125587	11	0.021602	0.1950	91300.0	17800.03	824000	1328672.00	14.55		
75+	75	10	0.5	342.1558805	18	0.0526076	1	73500.0	73499.98	504672	504672.00	6.87		
<b>2002 - 2006</b>													<b>NCD Probability</b>	
0-4	0	5	0.3	751.0717536	0	0	0	100000	0	500000	7650210.81	76.50	Star pop.	100000
5-14	5	10	0.5	1525.562953	0	0	0	100000	0	1000000	7150210.81	71.50	Deaths	9090.5953
15-24	15	10	0.5	1358.025373	0	0	0	100000	0	1000000	6150210.81	61.50	AMR	0.090906
25-34	25	10	0.5	1104.667616	0	0	0	100000	0	1000000	5150210.81	51.50	Percentage	9.0905953
35-44	35	10	0.5	959.9091996	1	0.0010418	0.010363669	100000	1036.37	994818	4150210.81	41.50		
45-54	45	10	0.5	1144.819053	3	0.0026205	0.025866104	98963.63	2559.80	976837	3155392.64	31.88		
55-64	55	10	0.5	744.5589695	9	0.0120877	0.113987686	96403.83	10988.85	909094	2178555.33	22.60		
65-74	65	10	0.5	654.8745972	12	0.0183241	0.167861609	85414.98	14337.90	782460	1269461.28	14.86		
75+	75	10	0.5	208.6362349	26	0.1246188	1	71077.08	71077.08	487001	487000.96	6.85		

2007 - 2011													NCD Probability	
0-4	0	5	0.3	633.2160454	0	0	0	100000	0	500000	7819441.89	78.19	Star pop.	100000
5-14	5	10	0.5	1277.007075	0	0	0	100000	0	1000000	7319441.89	73.19	Deaths	4309.672
15-24	15	10	0.5	1263.696855	0	0	0	100000	0	1000000	6319441.89	63.19	AMR	0.0430967
25-34	25	10	0.5	803.120466	0	0	0	100000	0	1000000	5319441.89	53.19	Percentage	4.309672
35-44	35	10	0.5	948.0187313	1	0.0010548	0.01049	100000	1049.30	994754	4319441.89	43.19		
45-54	45	10	0.5	1018.259582	0	0	0	98950.70	0	989507	3324688.37	33.60		
55-64	55	10	0.5	733.737208	5	0.0068144	0.06590	98950.70	6520.75	956903	2335181.35	23.60		
65-74	65	10	0.5	662.1342699	12	0.0181232	0.16617	92429.95	15359.46	847502	1378278.07	14.91		
75+	75	10	0.5	236.2942113	21	0.0888723	1	77070.49	77070.49	530776	530775.85	6.89		

**APPENDIX 2: 103 CAUSE LIST OF THE INTERNATIONAL STATISTICS CLASSIFICATION OF DISEASES AND  
RELATED HEALTH PROBLEMS, 10<sup>TH</sup> DIVISION (ICD 10v2)**

<b>List code</b>	<b>Disease</b>	<b>ICD Codes</b>
<b>1-001</b>	<b>Certain infectious and parasitic diseases</b>	<b>A00–B99</b>
1-002	Cholera	A00
1-003	Diarrhoea and gastroenteritis of presumed infectious origin	A09
1-004	Other intestinal infectious diseases	A01–A08
1-005	Respiratory tuberculosis	A15–A16
1-006	Other tuberculosis	A17–A19
1-007	Plague	A20
1-008	Tetanus	A33–A35
1-009	Diphtheria	A36
1-010	Whooping cough	A37
1-011	Meningococcal infection	A39
1-012	Septicaemia	A40–A41
1-013	Infections with a predominantly sexual mode of transmission	A50–A64
1-014	Acute poliomyelitis	A80
1-015	Rabies	A82
1-016	Yellow fever	A95
1-017	Other arthropod-borne viral fevers and viral haemorrhagic fevers	A90–A94, A96–A99
1-018	Measles	B05
1-019	Viral hepatitis	B15–B19
1-020	Human immunodeficiency virus [HIV] disease	B20–B24
1-021	Malaria	B50–B54
1-022	Leishmaniasis	B55
1-023	Trypanosomiasis	B56–B57
1-024	Schistosomiasis	B65
1-025	Remainder of certain infectious and parasitic diseases	A21–A32, A38, A42–A49, A65–A79, A81, A83–A89, B00–B04, B06–B09, B25–B49, B58–B64, B66–B94, B99
<b>1-026</b>	<b>Neoplasms</b>	<b>C00–D48</b>
1-027	Malignant neoplasm of lip, oral cavity and pharynx	C00–C14
1-028	Malignant neoplasm of oesophagus	C15
1-029	Malignant neoplasm of stomach	C16
1-030	Malignant neoplasm of colon, rectum and anus	C18–C21
1-031	Malignant neoplasm of liver and intrahepatic bile ducts	C22
1-032	Malignant neoplasm of pancreas	C25
1-033	Malignant neoplasm of larynx	C32
1-034	Malignant neoplasm of trachea, bronchus and lung	C33–C34
1-035	Malignant melanoma of skin	C43
1-036	Malignant neoplasm of breast	C50
1-037	Malignant neoplasm of cervix uteri	C53



1-038	Malignant neoplasm of other and unspecified parts of uterus	C54–C55
1-039	Malignant neoplasm of ovary	C56
1-040	Malignant neoplasm of prostate	C61
1-041	Malignant neoplasm of bladder	C67
1-042	Malignant neoplasm of meninges, brain and other parts of central nervous system	C70–C72
1-043	Non-Hodgkin's lymphoma	C82–C85
1-044	Multiple myeloma and malignant plasma cell neoplasms	C90
1-045	Leukaemia	C91–C95
1-046	Remainder of malignant neoplasms	C17, C23–C24, C26–C31, C37–C41, C44–C49, C51–C52, C57–C60, C62–C66, C68–C69, C73–C81, C88, C96–C97
1-047	Remainder of neoplasms	D00–D48
<b>1-048</b>	<b>Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism</b>	<b>D50–D89</b>
1-049	Anaemia	D50–D64
1-050	Remainder of diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D65–D89
<b>1-051</b>	<b>Endocrine, nutritional and metabolic diseases</b>	<b>E00–E88</b>
1-052	Diabetes mellitus	E10–E14
1-053	Malnutrition	E40–E46
1-054	Remainder of endocrine, nutritional and metabolic diseases	E00–E07, E15–E34, E50–E88
<b>1-055</b>	<b>Mental and behavioural disorders</b>	<b>F01–F99</b>
1-056	Mental & behavioural disorders due to psychoactive substance use	F10–F19
1-057	Remainder of mental and behavioural disorders	F01–F09, F20–F99
<b>1-058</b>	<b>Diseases of the nervous system</b>	<b>G00–G98</b>
1-059	Meningitis	G00, G03
1-060	Alzheimer's disease	G30
1-061	Remainder of diseases of the nervous system	G04–G25, G31–G98
<b>1-062</b>	<b>Diseases of the eye and adnexa</b>	<b>H00–H59</b>
<b>1-063</b>	<b>Diseases of the ear and mastoid process</b>	<b>H60–H93</b>
<b>1-064</b>	<b>Diseases of the circulatory system</b>	<b>I00–I99</b>
1-065	Acute rheumatic fever and chronic rheumatic heart diseases	I00–I09
1-066	Hypertensive diseases	I10–I13
1-067	Ischaemic heart diseases	I20–I25
1-068	Other heart diseases	I26–I51
1-069	Cerebrovascular diseases	I60–I69
1-070	Atherosclerosis	I70
1-071	Remainder of diseases of the circulatory system	I71–I99
<b>1-072</b>	<b>Diseases of the respiratory system</b>	<b>J00–J98</b>
1-073	Influenza	J10–J11
1-074	Pneumonia	J12–J18
1-075	Other acute lower respiratory infections	J20–J22
1-076	Chronic lower respiratory diseases	J40–J47
1-077	Remainder of diseases of the respiratory system	J00–J06, J30–J39, J60–J98

<b>1-078</b>	<b>Diseases of the digestive system</b>	<b>K00–K92</b>
1-079	Gastric and duodenal ulcer	K25–K27
1-080	Diseases of the liver	K70–K76
1-081	Remainder of diseases of the digestive system	K00–K22, K28–K66, K80–K92
<b>1-082</b>	<b>Diseases of the skin and subcutaneous tissue</b>	<b>L00–L98</b>
<b>1-083</b>	<b>Diseases of the musculoskeletal system and connective tissue</b>	<b>M00–M99</b>
<b>1-084</b>	<b>Diseases of the genitourinary system</b>	<b>N00–N99</b>
1-085	Glomerular and renal tubulointerstitial diseases	N00–N15
1-086	Remainder of diseases of the genitourinary system	N17–N98
<b>1-087</b>	<b>Pregnancy, childbirth and the puerperium</b>	<b>O00–O99</b>
1-088	Pregnancy with abortive outcome	O00–O07
1-089	Other direct obstetric deaths	O10–O92
1-090	Indirect obstetric deaths	O98–O99
1-091	Remainder of pregnancy, childbirth and the puerperium	O95–O97
<b>1-092</b>	<b>Certain conditions originating in the perinatal period</b>	<b>P00–P96</b>
<b>1-093</b>	<b>Congenital malformations, deformations and chromosomal abnormalities</b>	<b>Q00–Q99</b>
<b>1-094</b>	<b>Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified</b>	<b>R00–R99</b>
<b>1-095</b>	<b>External causes of morbidity and mortality</b>	<b>V01–Y89</b>
1-096	Transport accidents	V01–V99
1-097	Falls	W00–W19
1-098	Accidental drowning and submersion	W65–W74
1-099	Exposure to smoke, fire and flames	X00–X09
1-100	Accidental poisoning by and exposure to noxious substances	X40–X49
1-101	Intentional self-harm	X60–X84
1-102	Assault	X85–Y09
1-103	All other external causes	W20–W64, W75–W99, X10–X39, X50–X59, Y10–Y89

*Child Mortality – Special tabulation*

<b>3-001</b>	<b>Certain infectious and parasitic diseases</b>	<b>A00–B99</b>
3-002	Diarrhoea and gastroenteritis of presumed infectious origin	A09
3-003	Other intestinal infectious diseases	A00–A08
3-004	Tuberculosis	A15–A19
3-005	Tetanus	A33, A35
3-006	Diphtheria	A36
3-007	Whooping cough	A37
3-008	Meningococcal infection	A39
3-009	Septicaemia	A40–A41
3-010	Acute poliomyelitis	A80
3-011	Measles	B05
3-012	Human immunodeficiency virus [HIV] disease	B20–B24
3-013	Other viral diseases	A81–B04, B06–B19, B25–B34
3-014	Malaria	B50–B54
3-015	Remainder of certain infectious and parasitic diseases	A20–A32, A38, A42–A79, B35–B49, B55–B94, B99
<b>3-016</b>	<b>Neoplasms</b>	<b>C00–D48</b>
3-017	Leukaemia	C91–C95
3-018	Remainder of malignant neoplasms	C00–C90, C96–C97
3-019	Remainder of neoplasms	D00–D48
<b>3-020</b>	<b>Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism</b>	<b>D50–D89</b>
3-021	Anaemia	D50–D64
3-022	Remainder of diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D65–D89
<b>3-023</b>	<b>Endocrine, nutritional and metabolic diseases</b>	<b>E00–E88</b>
3-024	Malnutrition and other nutritional deficiencies	E40–E64
3-025	Remainder of endocrine, nutritional and metabolic diseases	E00–E34, E65–E88
<b>3-026</b>	<b>Diseases of the nervous system</b>	<b>G00–G98</b>
3-027	Meningitis	G00, G03
3-028	Remainder of diseases of the nervous system	G04–G98
<b>3-029</b>	<b>Diseases of the ear and mastoid process</b>	<b>H60–H93</b>
<b>3-030</b>	<b>Diseases of the circulatory system</b>	<b>I00–I99</b>
<b>3-031</b>	<b>Diseases of the respiratory system</b>	<b>J00–J98</b>
3-032	Pneumonia	J12–J18
3-033	Other acute respiratory infections	J00–J11, J20–J22
3-034	Remainder of diseases of the respiratory system	J30–J98
<b>3-035</b>	<b>Diseases of the digestive system</b>	<b>K00–K92</b>
<b>3-036</b>	<b>Diseases of the genitourinary system</b>	<b>N00–N98</b>
<b>3-037</b>	<b>Certain conditions originating in the perinatal period</b>	<b>P00–P96</b>
3-038	Fetus and newborn affected by maternal factors and by complications of pregnancy, labour and delivery	P00–P04
3-039	Disorders relating to length of gestation and fetal growth	P05–P08
3-040	Birth trauma	P10–P15

3-041	Intrauterine hypoxia and birth asphyxia	P20–P21
3-042	Respiratory distress of newborn	P22
3-043	Congenital pneumonia	P23
3-044	Other respiratory conditions of newborn	P24–P28
3-045	Bacterial sepsis of newborn	P36
3-046	Omphalitis of newborn with or without mild haemorrhage	P38
3-047	Haemorrhagic and haematological disorders of fetus and newborn	P50–P61
3-048	Remainder of perinatal conditions	P29, P35, P37, P39, P70–P96
<b>3-049</b>	<b>Congenital malformations, deformations, and chromosomal abnormalities</b>	<b>Q00–Q99</b>
3-050	Congenital hydrocephalus and spina bifida	Q03, Q05
3-051	Other congenital malformations of the nervous system	Q00–Q02, Q04, Q06–Q07
3-052	Congenital malformations of the heart	Q20–Q24
3-053	Other congenital malformations of the circulatory system	Q25–Q28
3-054	Down's syndrome and other chromosomal abnormalities	Q90–Q99
3-055	Other congenital malformations	Q10–Q18, Q30–Q89
<b>3-056</b>	<b>Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified</b>	<b>R00–R99</b>
3-057	Sudden infant death syndrome	R95
3-058	Other symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00–R94, R96–R99
<b>3-059</b>	<b>All other diseases</b>	<b>F01–F99, H00–H59, L00–L98, M00–M99</b>
<b>3-060</b>	<b>External causes of morbidity and mortality</b>	<b>V01–Y89</b>
3-061	Transport accidents	V01–V99
3-062	Accidental drowning and submersion	W65–W74
3-063	Other accidental threats to breathing	W75–W84
3-064	Exposure to smoke, fire and flames	X00–X09
3-065	Accidental poisoning by and exposure to noxious substances	X40–X49
3-066	Assault	X85–Y09
3-067	All other external causes	W00–W64, W85–W99, X10–X39, X50–X84, Y10–Y89

### APPENDIX 3: KEY CONCEPTS AND DEFINITIONS

**Adult Mortality:** The probability of dying between the ages of 15 – 60 that is, the probability of a 15 year old dying before reaching the age of 60, if subject to current age-specific mortality rates between those ages.

**Age Specific Mortality Rate:** Relates the number of deaths of a particular age-group, in a specific calendar year, to the mid-year population in total in the same age group.

**Age Standardised Rates:** The number of deaths that would occur if subject to the same age structure as the standard population and the age-specific rate.

**Birth:** The complete expulsion or extraction from its mother of a product conception, irrespective of the duration of pregnancy, which after such separation, breathes or shows any or other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live born regardless of gestational age (all live born infants should be registered and counted as such, irrespective of gestational age or whether live or dead at time of registration, and if they die at any time following birth they should also be registered and counted as births).

**Crude Birth Rate (CBR):** The annual number of births occurring per 1000 mid-year populations.

**Crude Death Rate (CDR):** The annual number of deaths occurring per 1000 mid-year population

**Deaths:** The permanent disappearance of all evidence of life at any time after live birth has taken place (post natal cessation of vital functions without capability of resuscitation). This definition excludes foetal deaths, which are defined separately.

**Fertility Rate (TFR):** The average number of children a woman could give birth to, during her lifetime, if she were to pass through her childbearing years of 15 – 45 or 15 – 49 years in a given year.

**Infant Mortality Rate (IMR):** The number of deaths of infants under age 1 per 1000 population live births in a given year.

**Life Expectancy:** The average number of additional years a person could expect to live if current mortality trends were to continue for the rest of that person's life.

**NCD Premature Mortality:** The total number of deaths in adults and leading causes of death in the age group of 15 – 60.

**Place of Birth:** Refers to the name of province, territory or country in which the person was born.

**Rate of Natural Increase:** Rate at which a population grows (increase/decrease) during a given year, as the result of a surplus/deficit of births over deaths; expressed as a percentage of the base population.

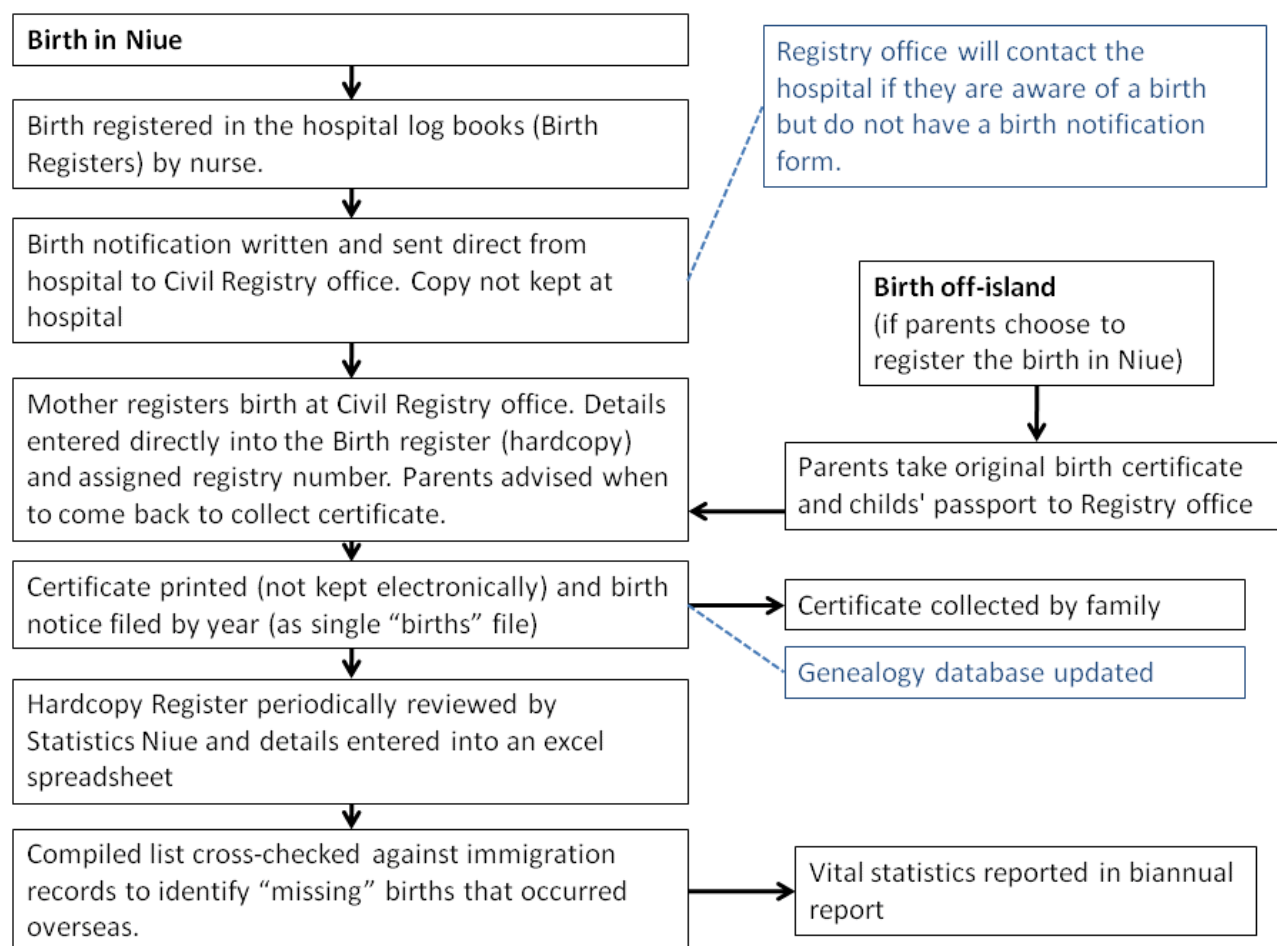
**Under 5 Mortality Rate:** Total number of deaths of children aged 1 – 4 during x year divided by the mid-year population of children aged 1 – 4.

## APPENDIX 4: GENERAL INFORMATION AND ACKNOWLEDGEMENTS

### REPORTING SYSTEM<sup>1</sup>

Key reporting processes, births and deaths for Niue are mapped below.

#### ***Birth reporting process***



For births a notification of birth is completed at the hospital and taken by health staff to the civil registry. This includes the sex of the child and parents' names. This information is also entered into a hard copy register at the hospital. The parents are then required to attend the civil registry office to complete the registration. There is a \$20 charge for a birth certificate but none for registration (without a birth certificate).

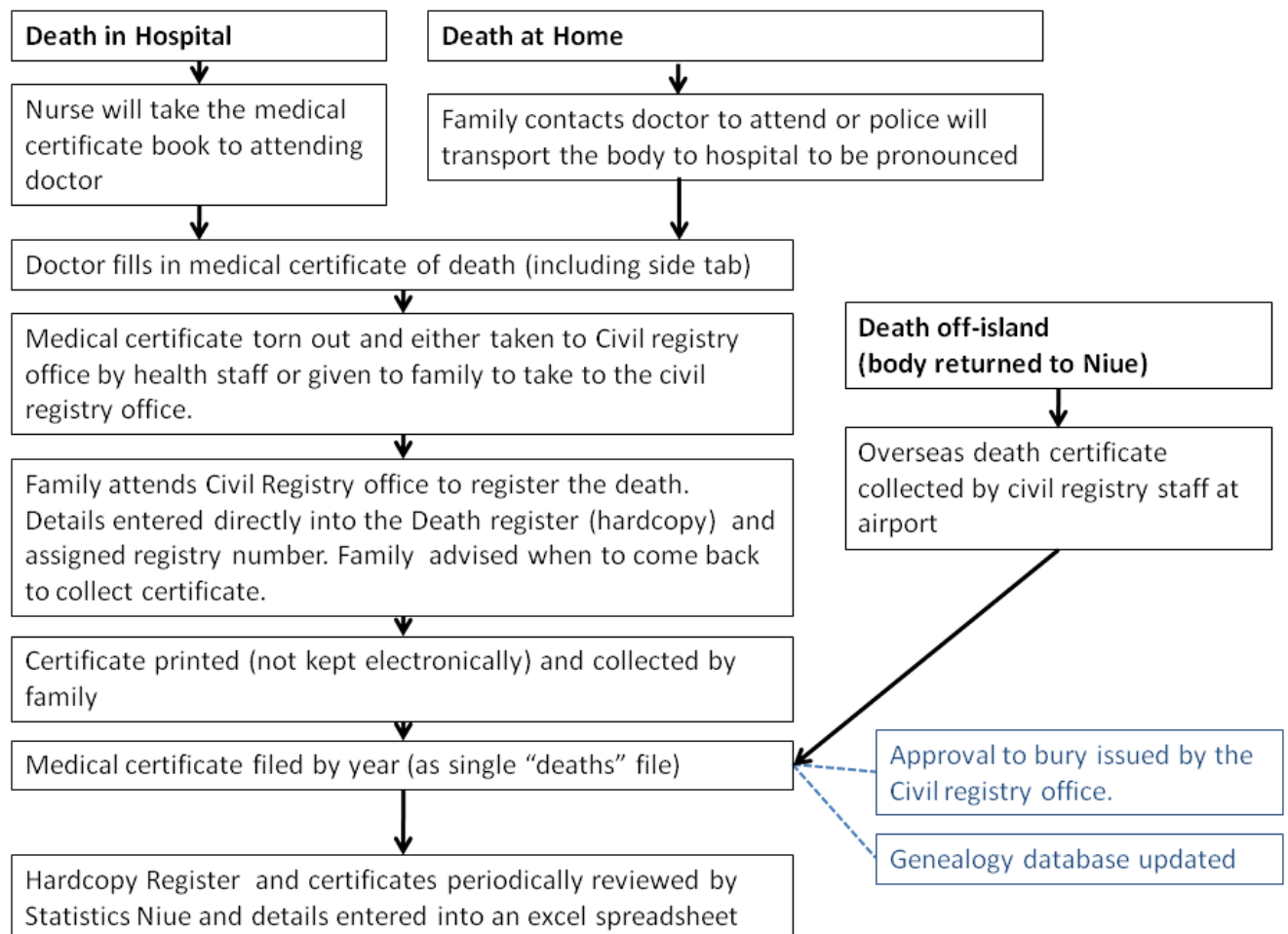
Essentially all births in Niue occur in hospital. There has been one home birth on island in the last 8 years at home. All other births outside the hospital occurred on the way. An Obstetrician was employed a couple of years ago which has significantly reduced the proportion of pregnant women travelling to New Zealand to give birth. Prior to this, there were very few births on island with most women either referred through the health service or self-referring to New Zealand.

<sup>1</sup> Extraction from Niue Country Visit Report – Vital Statistics and Civil Registration by Karen Carter, (SPC 2012)

For a child born overseas, parents may choose to register the birth in Niue (in addition to the original birth registration) until the child is 2 years of age. This however is optional process.

Maternal history cards are also maintained at the registry office, and births are entered onto the mothers' card and filed by village. The office also maintains this information in a genealogy database, which can only be searched by family name and village (not by dates).

### ***Death reporting process***



Deaths in the resident population who die overseas (such as patients who are referred for medical treatment and subsequently die, if the family decides not to return the body to Niue for burial) are not captured. These deaths are inherently difficult to track, and this is an issue for many countries in the Pacific.

For overseas deaths where the body is returned to Niue, it is accompanied by a death certificate from the place of death, which goes directly to the civil registry office on arrival. The overseas death certificate is retained on file (with the medical certificates for deaths that occurred locally) but is not entered into the logbook as the death has already been legally registered.

The National statistics office also maintains a “Statistical card” for each resident which is essentially a basic population register, including any date when the person has entered or left the island, date and place of birth, and (when applicable) date of death and registry number.

### **DISCLAIMER**

Statistics Niue gives no warranty that the information or data supplies contain no errors. However all care and diligence has been used in processing, analysing and extracting information. Therefore, Statistics Niue shall not be liable for any loss or damage suffered by the customer consequent upon the direct or indirect use of the supplied in this supplication.

### **ACKNOWLEDGEMENTS**

This report would not be without the assistance of various people and organisations and Statistics Niue would like to pass on sincere gratitude for their individual input ensuring that the information contained therein is relevant and useful to all users and stakeholders.

We would like to acknowledge with deep gratitude all the support and assistance received from various organisations within the respective Niue Government Departments that have helped in creating this report, especially from the Department of Justice, Lands and Survey and the Department of Health.

We are particularly grateful for the assistance given by the Chief Nursing Officer, Mrs PuasinaTatui from the Department of Health as well as the Births, Deaths and Marriage Officer, Mrs No’oroa Marsh from the Department of Justice, Lands and Survey for the discussions during the Strengthening Vital Statistics Workshop in Suva, Fiji. We would not have this report had it not been for their commitment and group effort.

My sincere gratitude is extended to the Vital Statistics and Civil registration Specialist from the Statistics for Development Programs in SPC Headquarters, Noumea, Ms Karen Carter for sharing her vast knowledge with Niue’s Statistics Officer.

To the people of Niue who are registered and for those who will after this report.

Finally to anyone I have failed to mention, thank you very much for all your support.

Fakaaue lahi



## **METADATA**

In brief: The information contained herein this report was extracted from:

- ❖ Births and Deaths Official Registries, from the Department of Justice, Lands and Survey
- ❖ Death Records from the Department of Health
- ❖ Migration Cards, Immigration Office of the Niue Police Department.
- ❖ Population Estimates, Statistics for Development Planning, Secretariat of the Pacific Community, Noumea, New Caledonia

It is important to note the following difficulties that often affect the outcome of the mothers that choose to travel to New Zealand to give birth and on return only some will register their babies with the Department of Justice, Lands and Survey. For those babies that are not registered with at the Civil Registrar, Statistics Niue are still able to get information by using the arrival cards, however the information on the arrival cards may contain error or it may not be completed correctly. Common examples include incorrect or failing to complete the birthdate and/or gender of the child.

There are cases which death occurs in New Zealand and the body is flown back to Niue for burial.

Comprehensive metadata will be provided in future reports